PEDAGOGICAL DESIGN IN BUILT ENVIRONMENT DISTANCE EDUCATION: A CRITICAL APPRAISAL OF STUDENTS' LEARNING STRATEGIES AT POSTGRADUATE LEVEL

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Abstract

Because of changing patterns of demand and advances in supporting technologies, distance education is a growing market in the higher education sector. Assuring and maintaining its quality is an important issue for those who deliver it. This requires the development of pedagogical design. The knowledge of how student learn is the basis to develop the theories of teaching. However, distance students' learning activities are invisible to the instructors and researchers, particularly those based in a comprehensive learning environment, such as a University. This has caused difficulties in improving pedagogy in distance education. This study aims to contribute new knowledge to deal with this dilemma: it is limited in scope to postgraduate level and the selected educational field is Built Environment studies. To do this requires a deep understanding of what distance education is, what main theories of pedagogy have been developed and applied, and how students learn within a distance learning environment in the selected field. By answering these questions, the key issues of understanding the distance learning experience can be identified, explored and tested.

To achieve these objectives, a mixed methods strategy has been designed. The key elements of the distance learning experience are considered, starting with an instrumental case study and continuing with a questionnaire survey. The case study provided in-depth knowledge on how students learn in the distance learning environment. Based on the case study, it was proposed that *metacognition* is the key to distance learning success, and an understanding of how students use learning strategy is the way to obtain the required knowledge for pedagogical development in this particular educational field. The outcomes of the case study produced a model of the distance learning experience and further research focused on the issue of learning strategies. A questionnaire survey produced 151 valid responses. The findings include both qualitative and quantitative data in regard to what and how learning strategies were developed by the participants. Through cluster analysis of learning strategies, evaluation of the correlations of relevant learning experience, comparing the means of the main factors, and comprehensive analysis, the outcomes of this thesis provide new knowledge of learning strategies for distance education. In addition, based on the discussions around the purpose and effectiveness of learning strategy, student demands for relevant knowledge and the influences of multiple factors, this thesis argues that developed metacognitive capability can, in fact, be a positive advantage of distance learners over their conventional counterparts, provoking a change in perspective on distance learning and recommendations for pedagogical change.

Key words: distance education, learning effectiveness, metacognition, pedagogy, student experience

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Preface

During the process of this research, philosophical foundation of social research has been reviewed. The huge amount of 'research methodology' literature provided knowledge of how different paradigms were applied into research by previous researchers. In my opinion, a research study starts from a problem and explore the truth attempts to solve the problem; the knowledge of philosophy and research methodology is the knowledge of others' experience, is provided to us for developing research ability rather than provided as a guidance for using in our own projects. A long-term deep investigation requires the researcher to critically analyse the emerged issues, adjust research direction, and have a view of multi-resources; need to focus on the central line- 'the problem', promoting the research process within a research environment which full of uncertainty and confusion; need to develop the quality of social research based on learning from different approaches. This approach is reflected in the current study.

This study focuses on developing pedagogical design of distance education. To understand pedagogical issues, a comprehensive understanding of the various influences on the student learning experience is essential. An open approach of exploring how students learn and how their learning experiences are impacted by current pedagogy was applied within the first stage of the investigation, i.e., a case study. In addition, to take into considerations of what happens in the student learning experience, survey research was carried out and focused on the identified major issue of learning strategy. During the whole process, different methodological approaches were applied. For instance, the idea of post-positivism in questionnaire survey, social constructivism in the case study, objectivism in exploring student experience, and symbolic interaction in evaluating the interaction between applied pedagogy and learning activities.

Along with the development of research inquiries, the pedagogical problems are explored from the point of view of environment, current theories, learning experience, and deep focus of learning strategies. When the new knowledge and arguments that finally emerged, this thesis also provides systematic information on how this study has narrowed its research direction; and how a researcher can overcome initial uncertainties and finally develop a paradigm.

At the end of the journey as a PhD researcher, it has become apparent that existing philosophies and their application in social research present the multi-views on what the world is and how the truth can be learnt. Within a rapid developed modern society, the quality of social research requires the researcher critically analyse the basis of each philosophical approach and its

application, explore the truth based on the real situation. This has been previously described as the 'pragmatic' approach. I have borrowed this word and used it in this thesis.

In Chapters Five, Six and Seven, the analysis, discussions and conclusions of the new knowledge about distance learning strategies and proposed changes of pedagogy are presented. I am pleased that my hard work within three years can contribute on the knowledge of distance learning. If, at the end, someone asks, why I choose to do a PhD in distance education, I would like to say, because this is where I can make my own contribution based on my experience as a teacher, an educational developer, a project manager, an overseas student and an experienced distance learner who has a sense of difficulties in learning; also, it is a self-development opportunity. The achievement of this research study is not only what I presented in this thesis, more importantly, it is the confidence I have developed in handling over a project, in participating into social research, and the developed potential in future career. These are the things I have learnt.

Shuting Guo

Acknowledgement

I would like to acknowledge and extend my heartfelt gratitude to the great supports on this project. Without the meaningful supports, it is impossible for me to overcome the difficulties I faced along the way and to grow up from an inexperienced researcher; it is impossible for me to complete this research project within expected schedule; it is impossible for me to achieve the outcomes in this thesis.

I would like to express my thanks to everyone had been involved in my supervision team. Thanks to Professor David Greenwood, for his support in built up a macro perspective of a PhD project; Thanks to Professor Liz McDowell, for her rigorous evaluation during the research progression; Thanks to Mr. Glenn Steel, for the help and inspiration he extended; thanks to Mr. Michael Daws, for his guidance at the beginning of this study; thanks to Mr. Keith Hogg, for his encouragement at the middle stage.

I would like to thank the participants of this study. Without their contribution, it is impossible for me to complete this study and to produce contributions to the body of knowledge.

I would like to thank the Graduate School in Northumbria University, for their arrangement of training sessions and comprehensive support. Without those trainings and support, it is impossible for me to improve my capability as a PhD researcher; and I would not be able to complete this thesis independently. I would like to thank the research committee in the School of Built Environment in Northumbria University and the one who attended the IPA and MPP meetings. Thanks for their evaluation and adjustment at the milestones of this project. Without these efforts, I would not be able to overcome the confusions and concentrate on the final research direction. I would like to thank the expertise and organisations in relevant research fields. Thanks to those provided encouragement and support on the issues of effective learning and improvement of the questionnaire.

I would like to thank my colleagues and friends, without their support, I would not be able to complete such a challengeable job in my second language; I would not be able to have an enjoyable life when this study was being undertaken.

Finally, I would like to thank my family. Without their love, I would not be able to focus on this long-term research project. Thanks for Xiaozhe, my dear daughter, for her company during my PhD time and be such an understandable and supportive girl.

Declaration

I declare that the work contained in this thesis has not been submitted for any other award and that it is all my own work. I also confirm that this work fully acknowledges opinions, ideas and contributions from the work of others. The work was done by the author alone.

Any ethical clearance for the research presented in this thesis has been approved. Approval has been sought and granted by the School Ethics Committee on collecting primary data.

Name:

Signature:

Date:

Chapter One - Introduction

1.1 Introduction and background

1.1.1 The problems of distance education and the focus of this study

In comparison with conventional education, distance education was classified as a 'non-traditional' (Moore, 1977) form which was developed during the first correspondence course in 1833 (Holmberg, 1986). The role of distance education complements the conventional provision in education and its variation of distribution have been widely researched (see, for example, Peters, 1998; Keegan, 1996). DE provides the opportunity of learning to learners who are not able (or prefer not) to attend an educational establishment: for instance, mature, part time and geographically isolated students (Adams and Hopkins, 1994; Bourn and Bootle, 2005). The students are provided the flexibility of choosing *what* and *how* they learn and freedom in determining tasks (White, 1995; Brown, 2001) and get the advantage of 'well organized teaching packs, flexibility and individual choice in pace, time and place of learning…(Collins, 2008, p.422)'.

In the last several decades, distance learning has grown at a dramatic pace. According to Methrotra *et al*. (2001), this growth has been driven by societal changes, new technologies, the demands for education in general, needs of diverse students, and change in the education sector. Researchers highlighted that a number of issues that have restricted its development.

Firstly, The qualifications obtained from DE lack equivalency compared with on-campus education (Latchem, 2011) and are not accepted by some employers and universities (Shrock, 2009). Distance learners therefore become 'second' priority of the society in comprision with their competators who graduate from conventional universities.

In addition, the high dropout rate has been a key issue (Simpson, 2006; Gaskell, 2009b) in DE practice. It has been found that dropout rates in open and distance learning are significantly higher than those in conventional universities (Narasimharao, 1999; Parker, 1999). In Europe, dropout rates range from 20 to 30%, while in Asian countries these percentages may be as high as 50% (Narasimharao, 1999; Shin and Kim, 1999). Researchers found a number of reasons for the high dropout rates. For instance, (Frankola , 2001) point out the problems of lack of time, lack of

support and poorly designed course; (Xeros et al., 2002) highlighted the impact of the changes or requirements occur in professional workplace, family and healthy issues.

Furthmore, internationalization and cross border higher education are developed currently. How to provide equal chance of learning to the learners, who come from a range of backgrounds, has emerged as a topic among the scholars (Davis, 2011; Baijnath, 2011; Tait and Gaskell, 2011). It is also a challenge for distance learners to learn within an unknown environment which may be provided by the designers come from different cultural background. This again questions whether the quality of higher education can be achieved in DE in an internationalised environment.

Moreover, lack of appropriate pedagogy for DE has been previously discussed in academic research (Engelbrecht, 2003; Alexander, 2001; Beetham and Sharpe, 2007). It is continuously challenged by social inclusive issue in multi-culture background during the internationalisation (Tait and Gaskell, 2011; Prinsloo, 2011) and development of technology (Anderson, 2009).

The consideration of the problems, the lack of acceptance to the society and problems of DE indicates that DE has both external and internal problems. Externally, it is evident that there is a lack of acceptance that DE exists in the society. Internally, existing problems of DE operation are caused by pedagogy. External problems (low acceptance of the society) are potentialy caused by the internal problems. Developing appropriate pedagogy to improve the quality of higher education is a way to solve internal problems and eventually drives the innovations of social perspectives on DE. Pedagogical concepts can help in improving educational policy and objectives (Peters, 1998). According to Hannafin and Land,

> Pedagogical influences focus on the activities, methods, and structures of the learning environment; pedagogical foundations emphasize how an environment is designed and its affordances are made available.
>
> (Hannafin and Land, 1997, p.174)

Improvement of DE pedagogy has seen a focus in social research according to the issues of educational quality and, particularly the issue of internationalisation along with the development of technologies. Issues related to the quality of higher education which have been discussed, include student diversity, isolation, learning support and use of technologies. The outcomes of relevant research (for instance, the research outputs from JISC) guide the rapid growth of DE. However, the theories, instruments and technologies developed in general DE are not able to be fully applied to DE programmes in mixed institutions (definitions are provided in Section 4.2.4) because of their limited capability. How to develop appropriate pedagogy in mixed institutions

therefore becomes the focus of this study. Within which, the field of Built Environment (see Section 2.6.2) is selected based on its characteristics.

In addition, the features of learning at different levels of education require relevant pedagogy. It is important to develop theories based on the features of learners and their learning. The original aim of this study is 'to explore student experience of distance learning for pedagogical improvement in encouraging effective distance learning at postgraduate level'. In further consideration of the features of DE in the Built Environment, the investigation of this study is focused on postgraduate level in the Built Environment. Detailed identification of the scope of this research is provided in Section 2.6.

In considering the research inquiry of distance students learning experience at postgraduate level and the particular feature of Distance Education in the Built Environment, the scope of this research is defined as: distance learner's learning experience at postgraduate level in the Built Environment in the UK. This is shown diagrammatically in Figure 1.

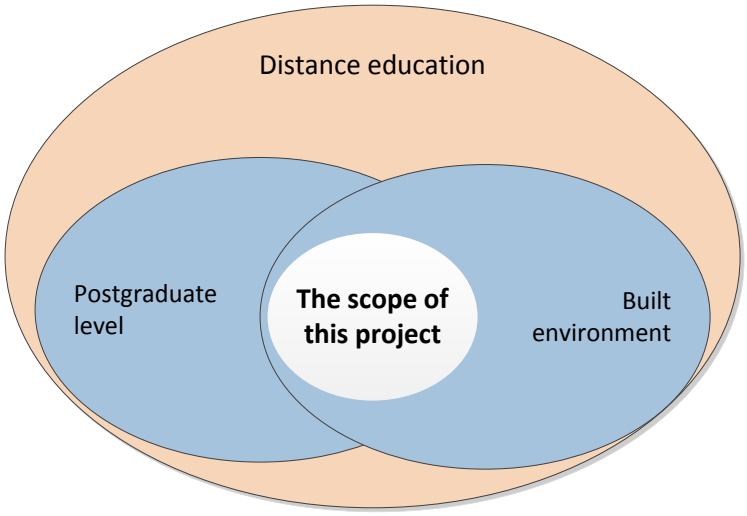


Figure 1. The scope of this project

1.1.2 Boundaries of the research

The research boundary is firstly set in terms of the selected research field. In order to contribute to the development of pedagogy in mixed institution with the consideration of its own features, issues of DE delivery are discussed within the research scope in respect to the data.

In addition, the purpose of conducting research into learning experience in this study is to develop pedagogy. When metacognition (definition is provided in Section 4.2.5) is defined as the key to distance learning success in mixed institutions, the meaning of metacognition and metacognitive

strategy is re-defined (see Section 4.3). This study is interested in how learning strategies are used, and students' capability of developing appropriate strategies which are most suitable for their own situations. The meanings of 'learning strategies' in students' perspectives are re-addressed in the data analysis. This thesis emphasizes the use of learning strategy and respect for how students understand it. Categories of learning strategies which have been previously defined in a variety of ways have less meaning to this study.

Furthermore, the research objectives defined in order to achieve the final aim set further boundaries. Details in the following section will explain these objectives.

1.2 Aim and objectives

The use of learning strategy becomes of the main learning activity which is explored in depth, evaluated and discussed in this study.

The aim of this research study is:

To critically appraise student experience of using strategy for improving pedagogical design in distance education (DE) at postgraduate level in the Built Environment.

At the start of the research process, research objectives were identified in order to achieve this aim, but following the exploratory case study these were amended for the following stages of the study. Therefore, research objectives are described as they relate to these two stages.

The research objectives which were identified at first stage were:

- To understand how learning experience is influenced by DE delivery
- To explore how students learn in DE
- To identify the key to distance learning success in the distance learning environment

Based on the case study findings at the first stage, use of learning strategy which reflects metacognition was defined as the key to distance learning success. Exploring *what and how* learning strategies are used by the students formed the new research inquiry and the research objectives were developed based on the new inquiry.

The research objectives at the second stage of primary research were:

- To test the role of using strategies in achieving success in distance learning
- To evaluate the potential improvements of metacognitive capability

1.3 Methodological steps

1.3.1 Introduction

In order to achieve the research objectives and the final aim, a pragmatic approach has been applied to the study in order to guide a strategy of mixed methods. The application of mixed methods was addressed in two stages, this being, a case study in the first stage and questionnaire survey in the second stage. Multiple methods were selected in a design of triangulation and both qualitative and quantitative data were collected in the questionnaire survey. The philosophical principle, research strategy and adaptation of multi-methods are shown in the model of the continuum of qualitative and quantitative research (Figure 2).

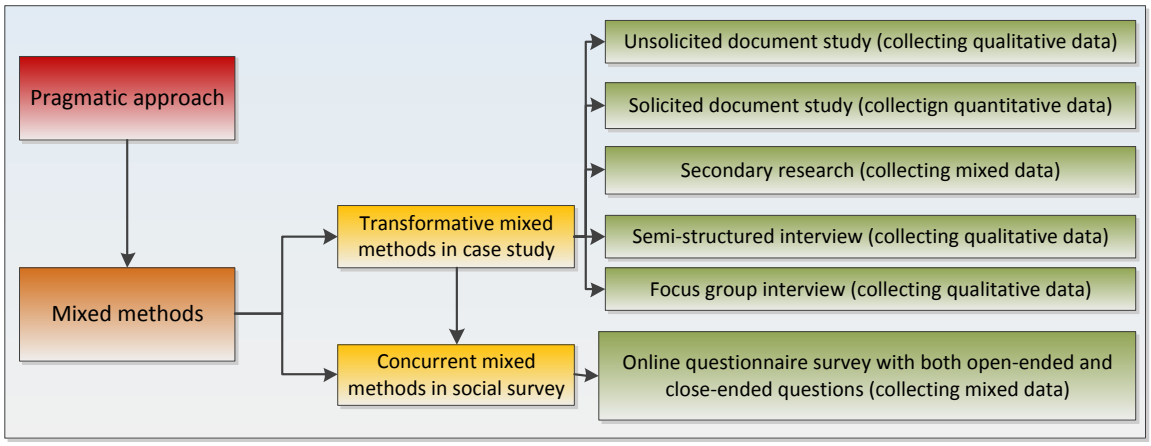


Figure 2. A model of research methodology

Figure 2 shows how data collection was driven by the research strategy and how research strategy was developed based on philosophical approach. Details of research methodology are presented in this section.

1.3.1 Philosophical principle – pragmatism

To explain how this study was driven by the philosophical approach, philosophical foundations of social research were studied. It is argued that social research is a combination of epistemology and ontology (Crotty, 1998). Crotty (1998; p.10) states that:

> Ontology is the study of being. It is concerned with 'what is', with the nature of existence, with the structure of reality as such…..for each theoretical perspective embodies a certain way of understanding what is (ontology) as well as a certain way of understanding what it means to know (epistemology).

Objectivism, constructivism and subjectivism are identified by Crotty (1998) as the philosophical foundations of social research. In addition, Creswell (2009) developed four philosophical worldviews in social research, namely: the postpositive, social construction, advocacy/participatory and pragmatic approaches. The application of the knowledge of philosophy helps researchers in thinking about how to carry out social research based on a relevant worldview. To avoid confusion in applying theories in social research, a pragmatic approach suggests that the design of research needs to be done by analysing what knowledge is needed to answer the particular research question(s).

On analysing the role of philosophies in social research, research is founded to be basically about exploring the truth. To achieve the aim of this project, research objectives were analysed based on the needs of knowledge. These objectives were developed and subsequently achieved during the actual research process. Referring to the existing literature, Pole and Lampard (2002) indicate that 'research needs a degree of flexibility in its design in order to cope with the unexpected; a clear and unambiguous focus; to be feasible; to be realistic' (p.31). Flexibility also is emphasized by the discussions of process-led research. According to May (2001), there are five ways to apply social theories in social research. These are: 1) inductivism, 2) deductivism, 3) development of paradigms, 4) critical theory and realism (which emphasise the ability to diagnose and inform change), 5) 'by being grounded in the same constructs as people use in interpreting their social environments in everyday life' (May, 2001, p.48). Apart from Inductivism and Deductivism, the ideas of the other methods suggest an approach of process-led research. The process-led research contains different epistemological principles. As discussed previously, 'social sciences are dynamic disciplines' (May, 2001, p.37) and 'particular epistemological principles and research practices do not necessarily go hand in hand in a neat unambiguous manner' (Bryman, 2004, p.15).

This is similarly discussed by Creswell (2009) who prefers a pragmatic worldview and together with post positivism, social constructivism, a participatory one. Instead of being committed to one system of philosophy, pragmatism 'applies to mixed methods research in that inquirers draw liberally from both quantitative and qualitative assumptions when they engage in their research' (Creswell, 2009, p.10). Combining different worldviews and choosing multi-methods to achieve the best understanding of the research problems are the way pragmatists execute social research. It is also the philosophical worldview in undertaking this research project.

The approach in driving the research process in current study is to achieve the final aim. This guided the design of research strategies and data collection. Flexibility was considered at the

beginning which allowed the development of inquiry at the end of the initial stage; and different philosophical approaches were combined. The approaches of constructivism (see the initial case study in Chapter Three) and positivism (see questionnaire survey in Chapter Five and Six) are critically considered and applied in order to pragmatically achieve the final aim.

1.3.2 Research methodology

Pragmatism emphasizes the research problem and selects research methods based on how to understand the problem (Creswell, 2009). To solve the existing problem and achieve the aim of this study, inquiry of knowledge in achieving research objectives guided the design of research strategy and selection of research methods. The aim of this study requires an understanding of learning experience and pedagogical issues within distance learning environment. Data therefore were collected from the aspect of teaching and learning such as experience of tutors, experience of students, and evidences of what student do in their learning. Mixed methods research is therefore defined as the methodology which is also an overall strategy as described in the following section.

1.3.3 Research strategy and use of multi-methods

The pragmatic approach suggests that the research strategy should be designed based on the requirements of research question and the three general strategies suggested by Creswell (2009), i.e., sequential mixed methods, concurrent mixed methods and transformative mixed methods.

For the purpose of this research study, a strategy of sequential mixed methods was designed and applied which are 'those in which the researcher seek to elaborate on or expand on the findings of one method with another method' (Creswell, 2009, Pp.14-15).There are two stages of primary research in the collection of data which are case study at the initial stage and social survey at the second stage.

The research objectives in the initial stage require both the knowledge of how student learn and how their learning is impacted and can be improved by the design of pedagogy. Referring the idea of constructivism, 'social phenomena and categories are not only produced through social interaction but that they are in constant state of revision' (Bryman, 2004, p.16). case study is identified as an suitable approach to achieve the research objectives at the initial stage. According to Yin (2003a, 2003b), the use of case study is a normal way to understand scenarios in a particular environment and to answer exploratory questions (Yin, 2003a; 2003b).

The investigation within the case study started with the aim of 'exploring the key to how students learn to deal with the pedagogical dilemma in DE'. Multi-methods were selected based on this

purpose such as document study, semi structured interview, and focus group. First of all, to achieve the research objectives, existing pedagogical problems were analysed from unsolicited document and staff interview. It has been discovered that pedagogic dilemma which existed in general DE was been found at postgraduate level in the Built Environment. Exploration of how students learn at a distance is therefore significant for improving DE pedagogy at postgraduate level in the Built Environment. In addition, students' interactive and independent learning experiences were analysed from the data collected though solicited document study and focus group interview. In short, multi-methods were selected based on the central purpose and collected data were analysed comprehensively; this is an application of transformative mixed-methods. As referred to Creswell (2009), transformative mixed methods 'uses a theoretical lens as an overarching perspective within a design that contains both quantitative and qualitative data' (2009, p.15).

A design of concurrent mixed methods is applied in the second stage of this research project. 'Concurrent mixed methods procedure are those in which the research converges or merges quantitative and qualitative data in order to provide a comprehensive analysis of the research problem…… data' (Creswell, 2009, p.14-15). For achieving the research objectives in second stage, both qualitative and quantitative data were collected in the research process. Firstly, survey research is generally regarded as quantitative and positivistic (de Vaus, 2002) and is used to collect the descriptive detail of identified variables and to analysis their relationships (Saunders *et al.*, 2007). According to Creswell (2003, p.153), 'A survey design provides a quantitative or numeric description … From sample results, the researcher is able to generalise or makes claims about the population'. The function of survey in quantitative research is adopted in the current research and issues were researched and analysed include to what extent students used learning strategies, the effectiveness of learning strategies and relevant influences. Secondly, survey is also capable in collecting qualitative data. Details of what and how learning strategies used in main learning activities were explored by open-ended questions. In short, both open-ended and closed questions were used in survey research to achieve the intention of getting both qualitative and quantitative data, the overall results were integrated in analysis.

1.3.4 Inductive research and deductive research at two stages

The operation of research at this stage applied an inductive research in which 'you would collect data and develop theory as a result of your data analysis' (Saunders *et al.*, 2007, p.117). At the first stage, the key to the distance learning experience was analysed based on how the distance learning environment was designed and how learning activities were shaped. Based on the findings and analysis in transformative mixed methods, case study found that interactions were

used as learning strategy in student experience and the key to distance learning success was identified as metacognitive capability which is shown as student experience of using strategy. The research inquiries are updated and a framework of distance learning experience is designed at the end of first stage research.

At second stage, the role of learning strategy on distance learning success is tested and the improvements of students' metacognitive capability in using strategies are examined. This is an application of deductive approach in which the researchers 'develop a theory and hypothesis and design a research strategy to test the hypothesis' (Saunders *et al.*, 2007, p.117). Findings of survey research tested the theory which developed in case study and expanded the knowledge of learning strategies. The analysis of qualitative data shows various learning strategies were used for self-direction, self-regulation and cognitive efficiency in DE. In addition, statistical analysis is applied to quantitative data. The effectiveness of learning strategies, the improvement of metacognitive capability, and influences of multi-factors are analysed through correlations between relevant factors and comparing means between groups. Spearman's correlation, t-test analysis and ANOVA are all applied in the statistical analysis. All of the techniques were assisted by using PASW© (previously known as SPSS©) software which is a Microsoft tool (Kinnear and Gray, 2009; 2010) generally used for statistical analysis. Discussions of approaches in developing DE pedagogy are made based on these analyses.

To overview the research process, inductive research was carried out at the first stage and deductive research was carried out at the second stage within the sequential mixed methods. The outcomes of inductive research conducted a new approach of how distance learning experience can be effective. It is tested and developed with the deductive research within the second stage. With the two stages, research objectives are achieved. The outcomes of this study contribute new knowledge of learning strategies on the knowledge of DE which allows recommendations to pedagogical design. The final aim thus is achieved. The procedure is shown in Figure 3.

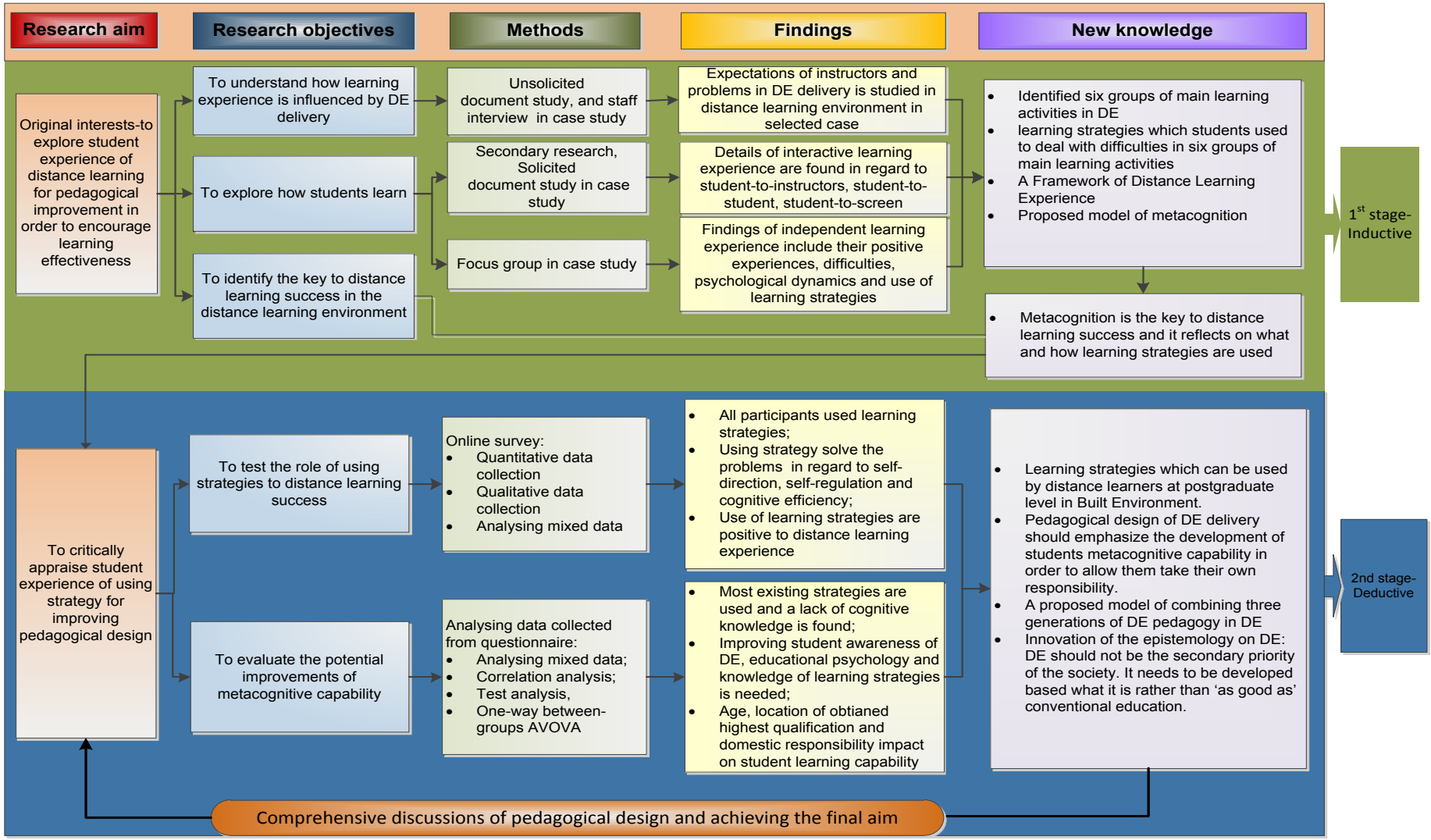


Figure 3. Overview of this research study

1.3.5 Validity and reliability

During the research process, reliability and validity are considered in data collection and analysis. According to Newman and Benz (1998), validity is one criterion applied in both qualitative and quantitative research with reliability and objectivity.

Firstly, validity and reliability are considered within data collection and data analysis. According to Denzin (1994, p.296), 'Without validity (authority) there is no truth, and without truth there can be no trust in a text's claim to validity'. To ensure validity of the case study, existing theories are studied to guide the data collection from different angles, to avoid disturbing to the case and to analyse the issues by looking at the evidence from different aspects and testing the results in the survey research (see Chapter Three). The identified key to distance learning success has validity because of the overview of institutional capability and holistic evidence of student experience. In addition, the findings of the student learning experience in the case study are considered less reliable because they are limited within a certain programme. Findings of the social survey provide more details of how learning strategies were used and tested students' overall experience of metacognitive learning. The role of learning strategies in problem-solving and their effectiveness in creating positive experience are proved through both qualitative and quantitative analysis. In addition, outputs of statistical analysis suggest how metacognitive capability can be improved and which factors impact on it.

Secondly, reliability is ensured in sampling. The participants of the online survey were free sampled from the focused field. To confirm that the participants are qualified as postgraduate students in the Built Environment and learn by DE, the online link was send to the students through the internal system (see Section 5.1.4.2). In addition, two items were included for the unqualified participants to complete, one is connected with the field they are studying and the other is about the level at which they are studying (see Appendix 10).

Thirdly, objectivity is ensured through reducing the influence of the researcher. In social research, the researcher needs to select information, design the research strategy, operate the data collection and interpret data. The quality of this study is firstly ensured based on the personal development of the researcher because the perspective, interest and quality of the researcher drive the direction and the quality of social research. Without the required knowledge, the researcher would not be able to develop appropriate research inquiry and strategy. In addition, the interpretation of the qualitative data is an internal process of the investigator. A scenario can be interpreted differently by different individuals. The personal influence of the researcher in analysing outcomes cannot be ignored. It is therefore important to develop an appropriate theoretical framework to ensure the quality of this research. In this project, cross-discipline theories were studied. Systematic knowledge of existing theories is

referred to in the design of research methods, reducing negative influence on data collection and theoretical study, and improving the interpretation of collected data.

1.4 Originality and contributions

1.4.1 Originality

The outcomes of this thesis provide an original *Framework of Distance Learning Experience* (Section 4.4.4). The comprehensiveness of the framework in covering elements of distance learning experience was tested and it proves a reliable device for giving an insight into students' learning experiences in DE. This original framework will benefit stakeholders of distance learning in various ways:

1) It is a tool for the research of student learning experience.
2) This framework will allow institutions to develop their knowledge of learners and their experience. It can be used to develop student profiles for better support from the tutors and to be used to investigate any single scale of metacognition or a single distance learning activity with the consideration of other factors (Guo, 2011b).
3) It provides guidance as to how learners can learn in an isolated learning environment.

In addition, an original model that combines three generations of DE pedagogy is provided in Section 7.3.5. This model emphasizes the enhancement of student learning capability and considers the influences of relevant staff, learning support and using technology on learning activities in DE. This is a guidance of pedagogical design in order to deal with the pedagogical dilemma (as defined in Section 2.5.1).

The original *Framework of Distance Learning Experience* and the proposed model of *Combination of Three Generations of Pedagogy* in Distance Education provide answers to achieve the aim of this study, i.e., improving pedagogical design in distance education at postgraduate level in Built Environment. Institutions can know how students learn in an internationalised population by using the *Framework of Distance Learning Experience* in their investigation, and be able to develop their pedagogical design in DE delivery through applying the model of *Combination of Three Generations of Pedagogy in Distance Education*. Thus, all students, no matter how different are their situation, will have an equal chance to learn. This is one way to reduce dropout rate, ensure the quality of higher education and achieve social justice in the internationalisation of DE at postgraduate level in the Built Environment.

1.4.2 Contributions to the body of knowledge

The investigation of student experience in this thesis is focused on the use of learning strategies; the contributions of this study firstly include original knowledge relating to learning strategies in DE. These learning strategies are categorised based on the difficulties that occur in learning and knowledge of how these difficulties be solved by the strategies. This enables the learner to learn from the new knowledge and improve their learning capability; furthermore it allows institutions to modify DE delivery. In addition, the *original Framework of Distance Learning Experience* and modified *Distance Learning Experience Questionnaire* will contribute to the development of the knowledge of students' learning experience. Furthermore, this study provides a new approach of the key to distance learning success which is metacognition and use of strategy. Through developing the learners to take over their own learning, the objective of higher education can be achieved. i.e., DE will develop students' independence and successfully provides individuals with lifelong learning abilities. This requires changes of role of tutor, learning support, design of technology in three stages of DE delivery. Detailed recommendations of these changes are contributed at the end of this thesis. Finally, as the quality of higher education can be ensured by developing DE in terms its own feature, distance learners should not be the 'second priority'. In fact, distance learners have advantages on the ability of lifelong learning in comparison with conventional learners. This thesis finally contributes on the innovation of epistemology to DE.

Therefore, the contributions of this thesis are structured into five levels. These contributions are shown in Figure 4 as following.

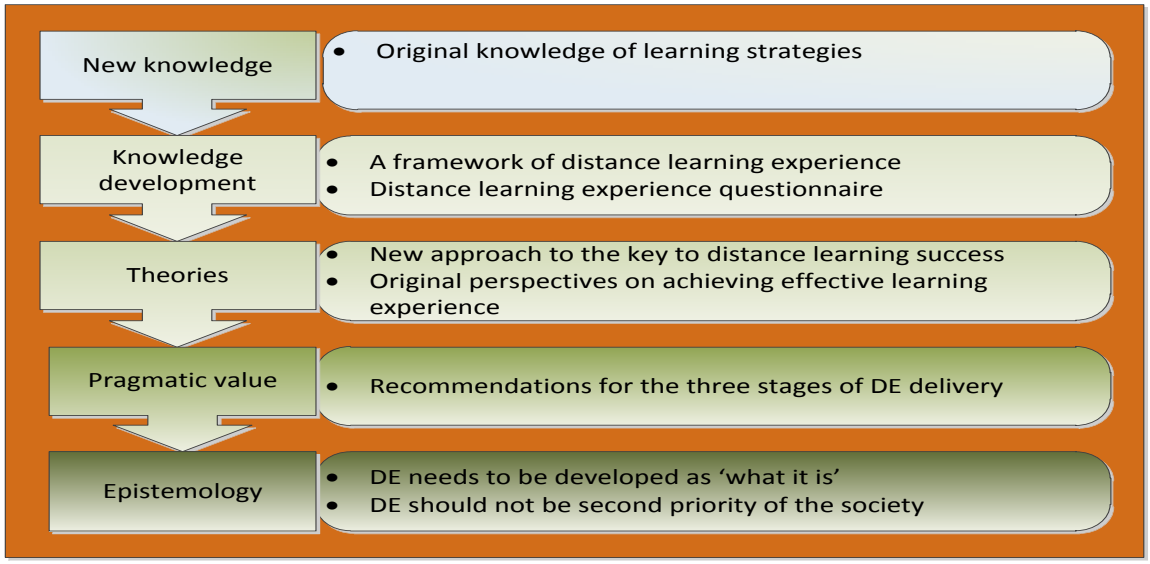


Figure 4. Originality and contributions of this thesis

As shown in Figure 3, this thesis has multiple contributions which contain five levels.

i. New knowledge, i.e., the knowledge of learning strategies
ii. Knowledge development. i.e., a *Framework of Distance Learning Experience* and Distance Learning Experience Questionnaire
iii. Theories., i.e., new approach to the key to distance learning success
iv. Pragmatic value. i.e., the model of Combining Three Generations of Distance Education Pedagogy
v. Innovations in epistemology. . i.e., DE should be developed based on what it is and should not be the 'secondary priority' of the society.

These contributions were developed during the research progress based on theoretical study, data analysis and comprehensive discussions. Details of the content and the structure of this thesis are introduced in the following section.

1.5 Content of this thesis

This thesis is divided into seven chapters. The current chapter includes the aim and objectives of the research, methodology, implementation and achievements.

Chapter Two includes the background and the scope of this research study. Based on the review of relevant literature, a framework of the distance learning environment is included and pedagogical dilemma in DE is pointed out. The research is focused on pedagogical issues in DE at postgraduate level in the field of the Built Environment.

Chapter Three presents the data collection, findings and analysis of the case study. The design of triangulation and use of multi-methods are explained. The findings show the existence of pedagogical dilemma in the selected case. In addition, holistic knowledge of how students learn explored in the case study shows that, distance learners at postgraduate level mainly learn independently. Their learning environment is easily disturbed by multiple factors which produce difficulties in their learning. Learning strategies are their solutions to maintain motivation, deal with difficulties and seek support. Based on the findings, analysis in Chapter Three highlights the problems of the theory of interaction; a lack of knowledge in the independent learning experience in DE; main learning activities; and pedagogical issues which should be considered for improvement.

Chapter Four includes discussion of the key to DE success based on the findings of the case study in relation to a study of theories in relevant disciplines. A systematic examination of how students can learn effectively is carried out based on a model of CoI (see Section 4.2.1). Metacognition is discussed as the key to DE success at postgraduate level, which is reflected in how student use learning strategies to deal with different situations. A framework of distance learning experience is conducted in this chapter based on the six defined groups of

main learning activities, a theoretical study of the scales and relevant factors of metacognition, and characteristics of learners. Following the discussion, research objectives are developed and a questionnaire is designed for further study at the end of Chapter Four.

The findings and analysis in Chapter Five confirm the new approach, i.e., the key to distance learning success is the use of learning strategies which guided by students' capability of metacognition. Both quantitative and qualitative data of how and to what extent students use learning strategies show that using learning strategy plays a significant role in learning effectiveness in the majority of students' experience. In addition, a statistical analysis of the influences of learning strategy on effective experience proved its significance in reducing isolation, encouraging willingness to learn, and increasing student engagement. The significance of learning strategy to learning effectiveness and its role for the majority of students confirms the new approach (i.e., the key to distance learning success is metacognition and the use of technology) which was defined in Chapter Four.

Based on the deductive work of Chapter Five, pedagogical improvement is considered in Chapter Six. The main points which are analysed here include student demand for improving metacognitive capability, the influences of each scale of metacognition on learning effectiveness, the correlations between five scales of metacognition (horizontal factors in the framework of distance learning experience), the maintenance of metacognition (relationship between vertical factors in the framework of distance learning experience), and the influences of multi-factors on metacognitive capability. The results suggest that students' metacognitive capability needs to be improved, which can be achieved by improving student awareness of DE delivery, producing opportunities for students to gain knowledge of learning strategy, and providing knowledge of educational psychology.

Chapter Seven is the synthesis of the two stages of this study. Based on a philosophy of theory and practice, developing pedagogy in DE is discussed based on how students can improve their experience. The main elements of DE delivery, such as the role of the tutor, the design of learning materials, learning support and evaluation are discussed based on the purpose of improving metacognitive capability. Based on these discussions, this thesis concludes with the changes in pedagogies in practice, reflection of three generations of pedagogy in the changes, and the innovation in the perspectives on DE. At the end of this chapter, limitations to the research, recommendations for further research and reflection of research methodology are described.

Chapter Two - Theoretical Perspective and Research Scope

2.1 Introduction to this chapter

The focus of this study is to develop pedagogical design in DE delivery based on how students learn. A systematic literature study was conducted regarding this topic, this attempts to develop theoretical perspectives for primary research. There are three areas of existing literature studied in this chapter, namely:

- DE pedagogy
- Distance learning environment
- Student learning experience in DE

Firstly, the development of DE pedagogy requires an understanding of the application of pedagogy in distance learning along with its development. It is a premise for evaluating existing problems and seeking potential improvement. A review of DE pedagogy is therefore carried out. In addition, to develop pedagogical design in distance learning environment, a deep understanding of the characteristics of distance learning environment in selected scope is necessary. Consideration of this enquiry is included in this chapter. A model of characteristics of distance learning environment is conducted and pragmatic problems in DE deliveries are studied. Furthermore, knowing how students learn is crucial for developing the theory of teaching. Student learning experience is the central focus of this study. Previous research has contributed considerable knowledge on student learning experience in DE. This becomes one of the themes of this chapter.

In addition, the scope of this study is defined based on the particular feature of higher education at postgraduate level and the characteristics of DE in the Built Environment. The study of relevant knowledge in relation to this scope is also presented in this chapter.

2.2 Study of three generations of DE pedagogy

The development of DE pedagogy is studied from existing knowledge. Out of these, Anderson and Dron (2011) provide a systematic review on DE pedagogy and categorised three generations in their study. These are: cognitive-behaviourist, social constructivist, and connectivist pedagogy. The authors characterise the three types, noting that *cognitive-behaviourist* models are essentially ‘theories of teaching’ while *social–constructivist* models are ‘theories of learning’. They describe *connectivist* models as ‘theories of knowledge’

(Anderson and Dron, 2011, pp. 82-90). Relevant discussions are reviewed from a range of literature in order to understand each generation of DE pedagogy.

2.2.1 Literature study in relation to cognitive-behaviourist theory

Cognitive-behaviourist pedagogy is considered in individualisation of distance learning. Distance education provides the opportunity for individuals to learn in their environment due to the differences between individuals, individualisation is therefore seen as a feature of open and distance learning (Collins, 2008). By emphasising on the difference between individuals; individualization of DE is applied based on the knowledge of learners and their 'mind'. Relevant research in distance learning includes metacognition and motivation. The differences between individual learners are discussed by a number of researchers. The most relevant factors to learning are their cognitive styles and learning styles.

Different cognition styles are found in the research of how learners learn. Researchers believe that people's cognitive style is relatively fixed when learning styles could be developed (Riding and Rayner, 1998). Those learning strategies are categorised as serialists and holists (Daniel, 1975; cited in Brockbank and McGill 2007); 'analytic style' and 'action style' (Hayers and Allison, 1988). In addition, Kolb (1976) produces an experiential learning cycle which presupposes "a mix of 'hard–wiring' and 'soft-wiring' in an individual's learning approach. 'Effective learning involved a continuous development of learning style over time (Riding and Rayner, 1998, p.81)'.

Arguments about how learners can learn better in relation to the knowledge of learning styles include both it has positive impact on learning effectiveness (Payne and Whittaker, 2006) and it has no influences on learning experience (Hall & Mosley, 2005; Richardson & Price, 2001). Exploring the impact on learning of individual differences and designing positive learning environment for learners who differ from their learning styles are researched previously (Brockbank and McGill, 2007). This is approached by individualism in DE. Understanding the characteristics of individuals can facilitate better performance of DE (Marland, 1997). This is significant for appropriate learner support and adjusting it to suit needs of different individuals (Rowntree, 1992).

2.2.2 Literature study in relation to social constructivist theory

Social constructivist theory holds that learning is a social process, which will influence the degree of 'agency' experienced by the learner and therefore the degree of personal control they will experience over the learning event (Brockbank and McGill, 2007). It emphasises 'the wider social, cultural, and historical contexts of learning and the reciprocal interaction of these contexts with the individual' learning in order to construct shared knowledge (Mclnerney, 2010, p.20). Constructivist theory emphasises on interaction with 'more

knowledgeable others' as a psychological tool for thinking 'in the zone of proximal development and the role of culturally developed sign systems' (Vygotsky, 1978, cited in Cobb, 1999, p.13) and places a greater emphasis on … social interactions in … generation of knowledge or facts about the world' (Bell, 2011, p.101)'. As suggested by Mclnerney (2010), 'constructivism underlies many contemporary researcher themes which include metacognition, self-regulation, scaffolding, learning strategy and skills (p.21)'.

Learners must individually discover and transform complex information if they are to make it their own (Brooks and Brooks, 1993; Brown *et al.*, 1989). There is an emphasis on social dimensions of learning and collaborative learning and reflective learning are paramount (Slavin, 2000). Constructivist strategies are often described as 'student-centred instruction' (Mclnerney, 2010, p.21).

Following the philosophy of constructivism in context of DE, social presence and community are known to be important factors in engaging students and also in their eventual success (Gaskell, 2009a). By encouraging social presence and community, student-to-student interactions are widely researched and the developed theories are implied in practice. Also, based on social construction, self-direction and self-regulation needs to be adopted by learners which developed from the idea of learner should be active in the social process. Both interactive and independent learning are included in the ideas of social constructivism.

2.2.3 Literature study in relation to connectivism

The central idea of connectivism is that of a *learning community* with benefits and responsibilities regarding the transfer of information (Boitshwarelo, 2011). Connectivism developed along with the information technology and networked learning is the envisaged model. Networked learning combines online (networked) delivery with a participative, collaborative and situated approach to learning. Networked learners rely on connections with both electronic resources (for content) and people (Steeples, *et al.*, 2002). It emphasises the connection between learners and peers, teachers and resources (Jones and Steeples, 2002). The development of the theory of interaction is therefore facilitated by the idea of connectivism which highlights its role in the transfer of information.

As discussed later in Section 2.6.2, education in the Built Environment has its unique feature of being multi-disciplinary. For example, professional knowledge in a field such as construction keeps developing and changing with current practice. The information transferred and criticized in networked learning can facilitate the development of the body of knowledge. As a result, students in this field are potential beneficiaries. However, its proper application is critical and only works with appropriate technology (Bell, 2011).

2.2.4 Summary and analysis

The basic idea of three generations of DE pedagogy is that educationalists need to combine the function of each generation of pedagogy as no single generation can provide all demands and replace others (Anderson and Dron, 2011). How to achieve the proper design of the combination of three generations of the pedagogies is a challenge. This study considers this issue based on an understanding of distance learning environment, existing problems in the practice and how student learn.

2.3 A study of the distance learning environment

2.3.1 Terminology and definitions in this project

A study of distance learning environment firstly clarifies relevant definitions, such as distance learning, distance education and distance learning environment.

Distance learning is 'focus on the process and give an indication of the way in which it works' (Hodgson, 1993. p.32) and it is 'learning while at a distance from one's teacher, usually with the help of pre-recorded, packaged, learning materials' (Rowntree, 1992, p.29). Davis (1996) simply defines distance learning as 'the process whereby the student learns while separated from tutor' (P.20). In comparison with distance learning, 'Distance education' is a generic term that includes the range of teaching/learning strategy used by correspondence college,

open universities, distance departments of conventional providers' (Keegan, 1993, p. 34). Thus, Keegan (1996)'s approach can be understood: distance learning is one subsystem in distance education. In other words, distance learning is distinctly different from distance education as distance education is a form of education which includes a number of necessary elements. Whereas, distance learning is a set of learning activities which are different compared to the learning activities in traditional university/school learning.

In addition, with the advancement of information technologies and its wide use in distance learning delivery, the term 'e-learning' became popular. The popular use of "e-learning" has confused the definition of 'distance learning'. The discussion and delivery of distance learning nowadays is mostly considered in an e-learning environment rather than 'distance learning environment', in which, e-learning is a way to deliver distance education. This study distinguish the difference between e-learning and distance learning according to Tait *et al* (2008) which indicates that e-learning is used to describe 'the use of computer technology to support learning' (p.972).

In light of the increased importance of distance learning mechanisms, it is important to investigate and distinguish the differences between those terms by clearly defining them and

where they differ. This study researches into distance learning experience which exists in the field of distance education and contains the form of e-learning; distance learning is limited to the learning experience of students who study in DE programmes in the Built Environment at Postgraduate Level. Their learning experiences are the activities, opinions, psychological experience, and so forth which occur during the process of their learning.

2.3.2 Characteristics of distance learning environment

A number of characteristics of DE can be summarised from the early research of DE, for instance, the feature of separation of teaching and learning, the preparation of support, use of technology to deliver the content, supporting two way communications and the individualised study (Delling, 1966; Rowntree, 1992; Keegan, 1996). Referring to Keegan (1993, p.34), 'it is the distance between the teaching acts and the learning acts that is crucial, not the magnitude of the geographical separation of teacher and learner'. From a pedagogical view, even though the teaching act and learning act are separated in DE, the learning act is still carried out based on 'teaching act' (the provided system of *deliver, support and evaluate*). The process of DE delivery is understood here to be a prepared package of learning content, delivered through a designed system to achieve the aims of education. Learning content is then delivered and a support system contributes to help students in their learning. In addition, evaluation methods are used to measure the learning outcomes. Therefore, the components of distance learning environment and the process of DE delivery is defined as following,

- Institutions as the designer and deliverer of DE
- Learners as the actor of learning
- Learning activities engaging on learning in a distance learning environment which is separated from the teaching place
- Learning outcomes

In addition, DE is a systematic process (Moore and Kearsley, 2005). In this study, it is a knowledge transfer system built based on the nature of the separation of teaching and learning. Four components of DE are linked together within this system. This is shown in an original model as shown in Figure 5.

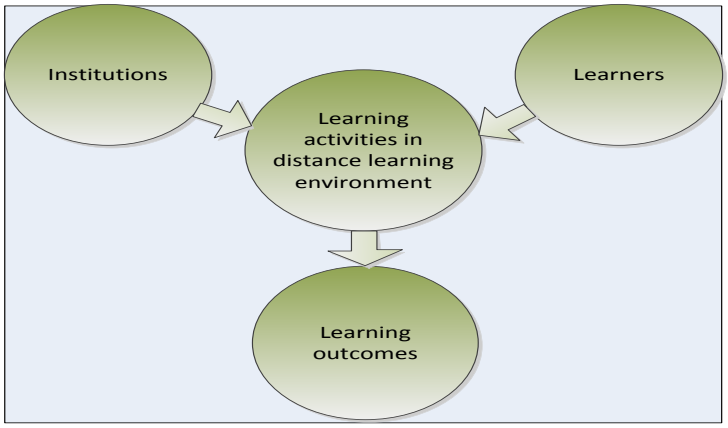


Figure 5. Four components in distance education

Within this system, both the teaching and learning acts are analysed separately. To analyse the teaching act, the left hand side of the transformation process shows that DE is delivered in three stages:

Stage One: Design and preparing learning content and the DE system

Stage Two: Delivery and support of learning

Stage Three: Evaluation of learning outcomes

The three stages of DE delivery are illustrated in a proposed diagram which is developed from Figure 5. It is shown as the following (Figure 6).

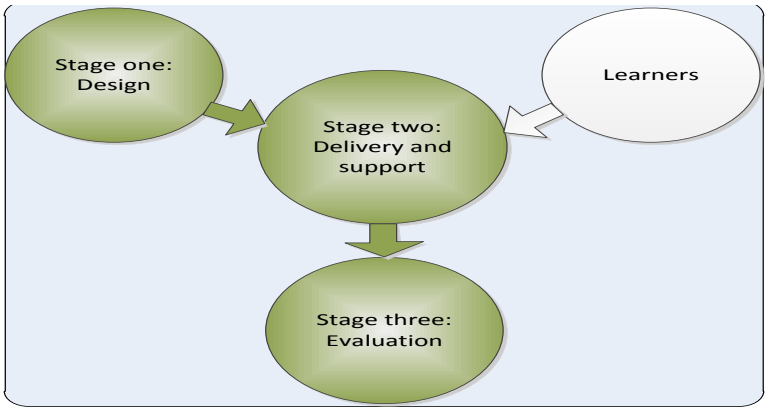


Figure 6. The teaching act in distance education

On the other hand, the learning act is analysed from the right hand side of the transformation. Within which, learners carried out learning activities based on the design of DE (first stage of DE delivery), use of technology in delivery and learning support (second stage of DE

delivery) and the methods of evaluation (third stage of DE delivery). The right hand side of the transformation (learning process) is designed in Figure 7.

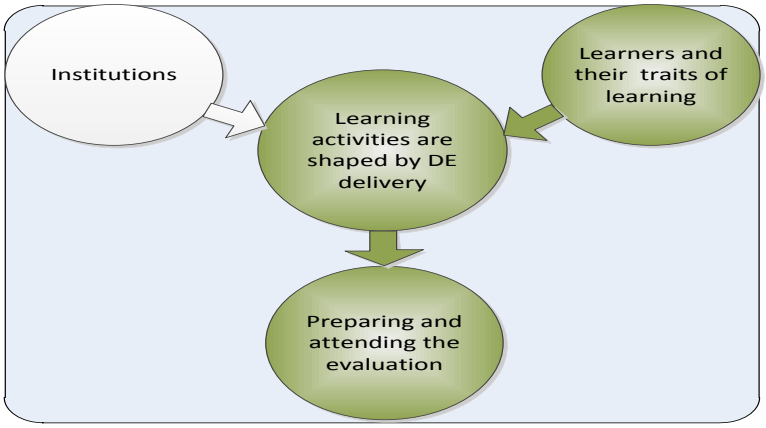


Figure 7. Proposed model of the act of learning in distance education

The characteristics of the distance learning environment can therefore be described. On the teaching side (left), institutions deliver knowledge (learning content) through a designed system. The design of the system includes design of organisational actions within three stages of DE delivery. On learning side, distance learners manage their own pace, time, environment and main points of learning content. Their learning environment in distance education is separated from the teaching place. Students require tutors' guidance and support throughout their learning. Technologies are therefore used in two-way communications. The characteristics of distance learning environment are illustrated in Figure 8 below.

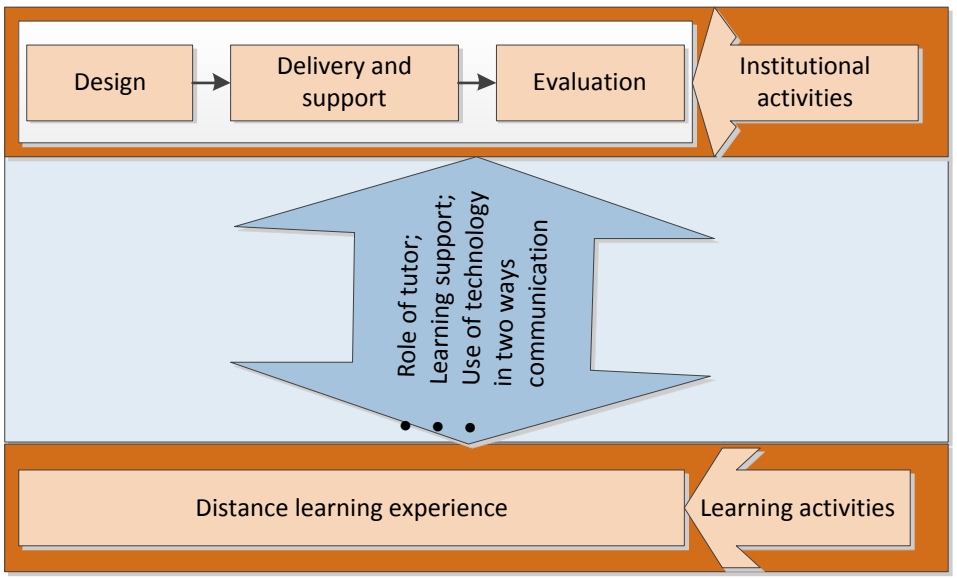


Figure 8. Proposed model of distance learning environment

Figure 7 shows that there are three elements in bridging the separation of institutional activities and learning activities, which are:

- Role of the teachers
- Using technologies
- Design and improvement of learner support

2.3.3 Practical problems in existing literature

2.3.3.1 Problems about the role of teacher

Researchers argue that the role of teachers in DE is radically different from traditional education (Davis, 1988; White, 1995). In DE, the tutor is conceived of as a 'resource person, a procedural specialist, and a co-inquirer' (Moore, 1986, p.12); they are central to facilitating learning, material delivery, and reflection upon practice (Kelly and James, 1994). The focus of the tutor's role is suggested to facilitate student's learning rather than delivery and this function is usually provided through course materials (Price, 1997).

In addition, Price (1997) reviewed a number of existing models of the tutor's role and stressed the 'facilitating of learning' rather than 'information delivery' (as the latter is done by course materials). Several other approaches have also been discussed; for instance: the 'responder of learning' (White, 1995); the 'joint enquirer' with students (Moore, 1986, p.12); the 'guider, helper and facilitator's of learning' (Zahedi and Dorrimanesh, 2008, p.161); the 'support provider' (Dzakiria, 2008), and 'co-learners' who play a 'mentoring role in collaborative learning environments' (Hung and Chen, 2001).

Furthermore, the distance learning tutor's important guidance role is carried out through the comments and feedback provided to students; as well as by the design of the materials. In isolated learning environments, learning materials and tutors comments are one of the only few links between the learning act and the teaching act. White (1995) has highlighted the difficulty teachers have in making an immediate reply to students' questions. However, empirical research demonstrates that delay and/or lack of feedback is a significant issue for students in DE. In order to promote positive learning environments and improve DE generally, there is a need for theoretical consideration of the tutors' contribution.

2.3.3.2 Problems about learning support

In distance learning, students learn on their own. They face many issues from the pre-course stage until even after graduation (Simpson, 2002). Learning support is an important factor for motivating learners and achieving success (Haihuie, 2006; Duhaney and Duhaney, 2006; Nanda, 2006; Parakh, 2006; Donald, 1997). Different items are used to describe the support which are provided by institutions for learners, such as, student support, learner support and

learning support. Learner support is defined as 'all those elements capable of responding to know a learner or group of learners, before, during and after the learning process' (Thorpe 2002, p.108). Other definitions is included in Simpson's research as 'all activities beyond the production and delivery of course material that assist in the progress of students in their studies' (Simpson, 2002, p.6), and Donald (1997, p. xi)'s research as 'The learning support consists of the entire setting in which learning takes place the disciplines that provide the knowledge learning support, the learners and the arrangements made for them, the teaching and learning process, and the assessment of learning, institution and programs'. Despite of that, this thesis will treat all of the terms as same meaning.

Simpson (2002) points out that the theoretical reasons for student support includes: feelings isolation and low morale; and the absence of support at different points in time can reinforce low morale and create higher levels of frustration and anxiety in students (Simpson, 2003). Previous literature (Garrison and Anderson, 2003, Thorpe, 2002; Salmon, 2002, 2004) illustrates the role in learner support of interaction, which has been classified by Methrotra *et al.* (2001) into three stages: (i) before enrolment; (ii) while enrolled; and (iii) after-course or program completion. Mitra (2009) on the other hand has proposed five stages (*pre-entry start-up, learning, evaluation and certification*, and *after-certification* phases).

The supports which should be provided to distance learners are suggested in various aspects. For instance, (i) in relation to the efficiency of learner support, learning strategies and cognitive skills (Simpson, 2002; Dzakiria 2008), organisational qualities and skills (Simpson, 2002) and interaction (Dzakiria, 2008) have been discussed. (ii) Keegan (1996) indicated that course development and learner support can be seen as two distinct systems. (iii) Methrotra *et al.* (2001) similarly addressed learner support in the areas of *admissions, financial aid, academic advising,* and *delivery of course materials, placement and counselling*.

In analysis, the demands of supporting learning to allow distance learners complete their learning in their own learning environment are well understood. However, the suggestions on what and how learning support should be designed and delivered are various. How learner support system is designed and how effective it is become the questions to the research of pedagogical issue.

2.3.3.3 Problems about using technology

Use of technology can bridge the separation of learners and learning providers by communication (Ingirige and Goulding, 2009; Methrotra, *et al.*, 2001; Keegan, 1996). It provides opportunities learning to learner who study away from the teacher in both time and space (Jarvis, 2003).

Use of technology in DE has its advantages and disadvantages. On the one hand, it can provide greater real opportunities for autonomous and individualized learning (Peters, 1998) greatly reducing the influence of distance (Ingirige and Goulding, 2009, p.75). On the other hand, some (e.g. Twigg, 2001) argue that the role of technology is that of a tool to facilitate learning and should not be overemphasised. It sometimes not matched with students' ability and perspectives in accepting it (Dzakiria, 2008).

How to take the advantage of technologies is discussed as a pedagogical issue. Some researchers argued that there is a lack of pedagogy in the design of DE technology (Alexander, 2001; Engelbrecht, 2003). Anderson (2009) described the relationship of technology and pedagogy in DE as one where 'technology sets the beat and creates the music' whilst pedagogy 'defines the moves'. However, when talking about 'technology set the beat', educationalists need to understand who suits the beat. Previously, factors of learning and differences between individuals were considered into the technological application in DE, for example, the impact of students learning styles on choosing technologies (Moore and Kearsley, 2005; Wall and Ahmed, 2004); the driving role of student diversity in design of technology (Minton *et al.*, 2004); and finally, its role in psychology and pedagogy (Miyazoe and Anderson, 2010).

In analysis, technology is provided for the benefits of accessibility and effectiveness of learning. The knowledge of learners (i.e. who, their characteristics, their learning style, etc) and their learning experience (how they learn) is the knowledge for how to design technology most effectively for the learners. Pedagogical issues in use of technologies with the consideration of learners' features need to be researched for the development of DE pedagogy.

2.3.4 Critical analysis

These issues discussed above require the development of DE pedagogies to guide and reduce the problems in practice. This needs the knowledge of how student learner. A deep understanding of how student learn and how their learning can be improved requires a critical evaluation on the influences of applied pedagogy. This is studied in the following section which includes an overview of existing knowledge of both interactive learning and independent learning.

2.4 Reviewing the research on how distance learners learn

2.4.1 Interactive learning

2.4.1.1 Interactions in distance learning

In considering the separation of teaching and learning in distance education, non-contiguous communication is believed as 'the main characteristics of distance education' (Holmberg, 1981, p.34). Holmberg (1983) conceptualised interaction between the instructor and student in the early days of DE when interaction was mostly in text form and mediated by postal services. Holmberg's theory of interaction can be identified as 'guided didactic conversation'. Interaction hence becomes a key to achieve successful distance learning in previous literature (Palloff and Pratt, 1999) and it is believed that increasing interaction can achieve more effective learning, student satisfaction and learning outcomes (Moore, 1992; Zhang and Fulford, 1994; Zirkin and Sumler, 1995).

According to Wagner (1994, p.8) 'Interactions are reciprocal events that require at least two objects and two actions. Interactions occur then these objects and events mutually influence each other'. According to the nature of the entities involved in the interaction process, Moore (1989) has classified three main types of interactions: (i) learner-to-instructor interaction; (ii) learner-to-learner interaction; and (iii) learner-to-content interaction. Anderson and Garrison (1998) believe that 'all types of interactions have importance in understanding the teaching-learning interactions' (p.101). A total of six modes of interaction in distance education are discussed:

- Learner to teacher interaction
- Learner to learner interaction
- Teacher to teacher interaction
- Learner to content interaction
- Teacher to content interaction
- Content to content interaction

Based on Anderson and Garrison (1998), it is argued that effective distance teaching and learning need to consider all six modes of interactions and make optimal combination based on different situations (Anderson, 2003b).

2.4.1.2 Problems in practice and arguments about effectiveness of interaction

Interpersonal interaction is believed to be the key to learning effectiveness and many distance educators provide for student-to-teacher interaction in their DE educational objectives (Anderson, 2003b). However, findings from experimental research found the relationship of

interaction with learning outcomes to be unclear, and that some students do not welcome such interaction, as expected. For instance, Su, *et al*. pointed out that

> though interaction is often billed as a significant component of successful online learning, empirical evidence of its importance as well as practical guidance or specific interaction techniques continue to be lacking……there is no clear direction or overview for online interaction.
>
> Su, *et al*. (2005, p.1)

In addition, Rekkedal (2009) carried out a study to examine students' needs in internet based distance study and found that majority students have not taken the advantage of using the course forums actively despite the learning support are encouraged through interaction.

The effectiveness of interaction and its role in distance learning was discussed previously. It is suggested that interactions with more learned others are significant in facilitating the development of higher mental processes to a learner (Vygotsky, 1978; as cited in Lajoie and Azevedo, 2006). However, through questioning and elaborating connectivism based on social constructivist thinking and an emphasis on dialogue, Ravenscroft (2011) argues that theories which are developed based on the role of dialogue need to be re-thought if dialogue is no more the way how people learn.

2.4.1.3 Critical analysis

Whilst conducting review of existing literature and conspiring the arguments, some questions have emerged in this process. Questions such as: Do those interactions cover all interactions in distance learning? What are the reasons for student do not engage into interactions? And how they learn when they do not use the course forum? These questions were taken into the initial case study and discussed based on the data collected from a holistic study of how student learn, which include independent learning experience in addition to interactive learning (see Chapter Three).

2.4.2 Independent learning

2.4.2.1 Independent learning and learning autonomy

Distance learners learn in their own environments. Compared with on-campus students, their learning is not guided by face-to-face tutorial, planned timetable and peer support in a shared on-campus environment. Independent learning and autonomous learning are important topics in the research of distance learning.

Distance learners are independent learners who accept a degree of freedom and are believed to know how to learn (Moore, 1972). Wedemeyer (1973) claims that independent study should

be self-pacing, individualised, and offer freedom in goal selection. He defines independent learning as:

> … learning, that changed behaviour, that results from activities carried out on by learners in space and time, learners whose environment is different from that of the school, learners who may be guided by teachers but who are not dependent upon them, learners who accept degrees of freedom and responsibility in initiating and carrying out the activities that lead to learning.
>
> Wedemeyer, 1973, p.73

Distance learning has its particular features and some specific issues, for instance, feelings of isolation and lack of motivation caused by the separation of teaching and learning. In their learning experience, distance learners are alone; they have high degree of responsibility for controlling their learning (Keegan, 1996). Their experience of self-responsibility of learning is described as autonomous learning by Moore (1994, p.3): 'the potential of distance learners to participate in the determination of their learning objectives, the implementation of their programs of study, and the evaluation of their learning'. A key component of the pedagogical dimension of DE is that a person is no longer 'the objective of educational guidance, influences, effects and obligations, but the subject of his or her own education (Peters, 1998, p.48)'. They are autonomous in a pedagogical sense.

2.4.2.2 Self-directed learning and self-regulated learning

Within DE, the tutor's guidance is mainly achieved through the design of the materials. To be able to select what needs to be learnt is a basic ability required of a distance learner. It is important for distance students to self-direct what should be learnt. Based on research conducted on adult education, Garrison (1997) believes that learners are intrinsically motivated to assume responsibility for constructing meaning and understanding when they have some control over the learning experience. In terms of long-term educational goals, self-directed learning is a necessity if students are to learn how to learn and become continuous learners. It is therefore important to study the 'emerging ideas about self-direction in learning within the field of adult education' (Anderson, 2005, p.109). In addition, learning occurs around family life and jobs. Students need to be self-regulated learners, who actively participate with self-motivation and can manage their learning in different ways (Lajoie and Azevedo, 2006). Researchers believe that self-regulated learners have knowledge of effective learning strategies and know how and when to use them (Slavin, 2000).

Self-direction and self-regulation have been considered as aspects of learning autonomy. In addition, learning strategy and motivation have been commonly covered in academic research

of self-directed and self-regulated learning (Moore, 1972; Keegan, 1996; Garrison, 1997b). A study of relevant discussions of learning strategies is carried out in the following section.

2.4.2.3 Learning strategy

Weinstein and Mayer (1986, p.315) define learning strategy as 'thoughts and behaviours intended to influence the learner's ability to select, acquire, organize, and integrate new knowledge'. It is 'a set of one or more procedures that an individual acquired to facilitate the performance on a learning task' (Riding and Raynes, 1998, p. 80). Distance learners need these strategies more than conventional learners (see, for example, White 1995; Jegede *et al*., 1999; Vermunt, 1996). The categories of the strategies have been discussed variously in existing literature and the research of Pintrich *et al*. (1993) has been frequently referenced by others.

Pintrich *et al*. (1993) categorise learning strategy into cognitive strategy, metacognitive strategy and resources strategy and they have produced a 'scale' of cognitive strategies involving (i) rehearsal, ii) elaboration, iii) organisation, and iv) critical thinking. They explain 'rehearsal' as 'the most basic cognitive strategy subscale. (e.g., repeating the words over and over to oneself to help in the recall of information)'; 'elaboration' involves 'paraphrasing, summarising' and the like; 'organisation' strategies include outlining; and 'critical thinking' concerns students' use of strategies to 'apply previous knowledge to new situations' or 'make critical evaluations of ideas' (Pintrich *et al*., 1993, Pp.802-803). In addition, the purpose of metacognitive strategies is to improve self-regulation by encouraging students to test their understanding (Jonassen, 1985). The theoretical model of metacognitive learning strategies focuses on the skills students use to plan their strategies for learning, to monitor their present learning and to estimate their knowledge in variety of domains (Everson *et al.*, 1997). According to Pintrich *et al.*,

> Metacognitive strategies are assessed by one large scale that includes planning, monitoring, and regulating strategies: a) planning (setting goals), b) monitoring (of one's comprehension), and c) regulating (e.g., adjusting reading speed depending on the task).
>
> Pintrich *et al.*, 1993, Pp.802-3

The third general strategy category is resource management which includes four subscales on students' regulatory strategies for controlling other resources besides their cognition. Again, according to Pintrich *et al*, 'Resource management strategies include a) managing time and study environment; b) effort management, c) peer learning, and finally d) help-seeking' (1993, p.802).

Apart from Pintrich *et al (1993), categories of* strategy also are discussed in other formats such as, Zimmerman and Martinez-Pons (1988, 1990) prefer to categorize the learning strategies of autonomous learners as follows: self-evaluation, organisation, goal-setting, planning, information-seeking, record-keeping, self-monitoring, environmental structuring, giving oneself-consequences for performance, rehearsing, memorizing, seeking social assistance, etc. These strategies similarly present the ways student seeking effective learning experience. Researcher point out that what is important is to knowing how to implement the appropriate strategies (Jones, 1985) such as learning effectively in a technology-enhanced environment (Ahmed, 2002). As Garrison (1997, p.25) observes, 'Learners will not succeed …[based upon] … the learner's proficiency (abilities and strategies) in conjunction with contextual and epistemological demands'. Researchers believe that it is institutions' responsibility to equip their students with the knowledge of learning strategies (Vermunt, 1996; Guo, 2011a). Learning strategy should be treated as tools that teacher can give to the students via training or strategy instruction (Oxford, 2003, p.82). Oxford (2003) suggests that effective strategy instruction requires the teacher's knowledge of learners' current strategy use, needs, and cultural beliefs; it also demands learners' full participation in the process of strategy development.

2.4.3 Mixture of interactive and independent learning in pedagogical design

Existing knowledge of interactive learning and independent learning have been considered in the design of DE. On the one hand, encouraging interaction is realised as key, based on the importance of 'dialogue' between teaching and learning; on the other hand, students learn in their own environment, and effective self-learning is essential for learning success. Previous research suggests that distance educators should get the balance right between independent study and interactive learning (Daniel and Marquis, 1979). 'Appropriate mixtures will result in increased learning and existing new educational opportunities; inappropriate combinations will be expensive, exclusive and exigent' (Anderson and Kuskis, 2007, p.305). However, Anderson (2003) pointed out that we are unlikely to find a 'perfect mix' that meets all learner and institutional needs across all curricula and content (Anderson, 2003, p.2)".

An appropriate mixture of independent learning and interactive learning in the design of DE requires institutions to have knowledge of their students and their learning experience. For instance, the knowledge of how they engage in interaction and independent learning, the knowledge of what difficulties they face in their learning process and how they manage it and the knowledge of how current theoretical guidance impacts on learning activities. The primary research of student learning experience in this research study takes an objective perspective to explore the 'reality'.

2.5 Critical analysis

2.5.1 Pedagogical dilemma in DE

To develop distance education and address existing problems, theoretical principles need to be applied in programme design (Mayes and De Freitas, 2007) which is treated as a matter of institutional strategy (Holley and Oliver, 2000). How DE pedagogy can be developed at postgraduate level with an appropriate mixture of three generations of pedagogy? Pedagogy is the knowledge about learning and teaching (Burn, 2007). Development of DE pedagogy firstly needs an understanding of what occurs in teaching and learning in distance education. Both aspects are vitally important as this informs how the teaching is applied and the effectiveness of learning. Without the knowledge of learning, teaching cannot be improved. Similarly, without the knowledge of how teaching is delivered, theories cannot be developed. Development of pedagogy therefore requires the knowledge of both teaching and learning experience, which can support institutions to improve the design of learning materials and DE delivery to suit individual characteristics (Jegede *et al.*, 1999). However, within DE, student learning experience is invisible to the instructors.

Firstly, lack of knowledge of learners is caused by the distance. Even though students' profile is able to provide the basic information of learners such as gender and age, factors which related to learning habits and learning effectiveness are hard to know. For instance, individual's leaning styles, the learning ability and preference of how to learn. Individualism therefore is difficult to be applied. Secondly, both independent and interactive learning is proposed by social constructivism, an appropriate design with the mixture of independent and interactive learning is realised as a challenge. A holistic view of how student learn is required. However, this is unknown to the instructors in DE. Thirdly, the idea of connectivism requires supportive technology and individual contributions. How students participate in filling the knowledge within their learning network need to be understand for developing pedagogy. This is able to be observed through on-line system in a technology-enhanced learning environment, however, student's willingness and difficulties in practice are still hard to know.

A pedagogical dilemma therefore can be identified. On the one hand, DE delivery requires a theoretical principle; a proper pedagogy needs to be produced based on the understanding of the learner, their learning experience, and their psychological dynamics. On the other hand, the learning process is not visible to instructors and pedagogy thus cannot easily be evaluated in the teaching and learning process. The concurrence between the necessary needs of pedagogy and invisible learning experience are identified as pedagogical dilemma in this thesis (see Figure 98).

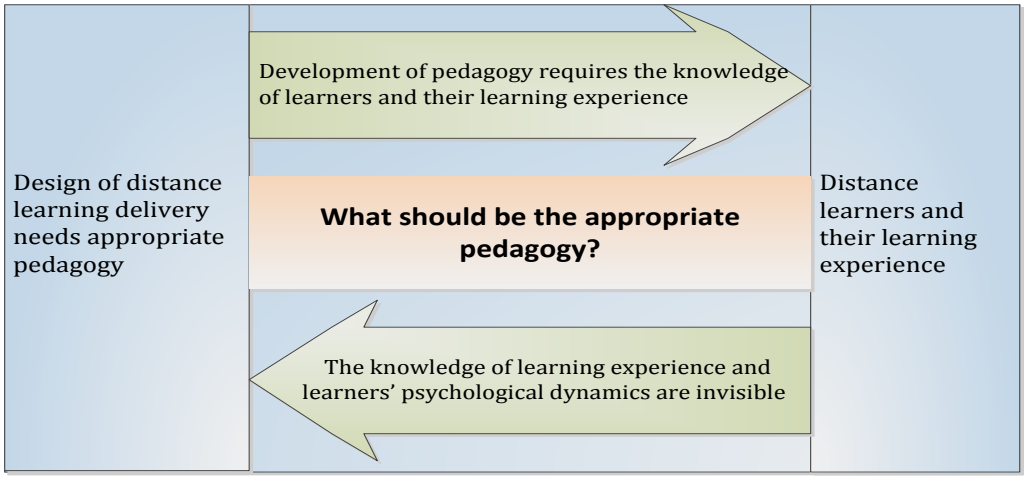


Figure 9. Illustration of the pedagogical dilemma in DE

To deal with the pedagogical dilemma as shown in Figure 9, knowledge of learners and their learning experience need to be explored. This study aims to find a solution to develop DE delivery and to properly combine three generations of DE pedagogy.

2.5.2 The identification of research objectives at first stage

'Social phenomena and their meanings are continually being accomplished by social actors' (Bryman, 2004, p.16). The activeness of learners in learning is firstly dependent on how the teaching programme is delivered. In a specific programme, the combination of the model applied, the strategy used, the technology and learning materials employed together will affect learners in this specific environment. In other words, in order to explore the potential development of pedagogy requires not only the understanding of a single scenario of learning experience, but also, more importantly, to understand the interactions and relationship with relevant factors. Referring to the theory of symbolical interaction, the research of a learning scenario needs to 'explore the understandings abroad in culture as the meaningful matrix (Crotty, 1998, p.71)'.

Early research has argued that learning environments mainly consider the classroom environment within the school (Fraser, 1986). A research study within distance learning environment needs to re-think the original source of classroom environment theories and to establish a proper instrument in terms of the nature of distance learning. To achieve the purpose of developing pedagogy based on the knowledge of students' learning experience, it is vitally important to first identify the focus of understanding how students learn in a distance learning environment. For this purpose, the associated research objectives are defined as:

- To understand distance learning environment
- To explore how students learn in DE on both interactive and independent experience

- To analyse the pedagogical influences on student experience
- To identify the main learning activities for achieving distance learning success in student experience

2.6 Understanding the scope of this research

How can DE pedagogy be improved to deal with existing problems and achieve positive experience? The existing problems and student diversity in global backgrounds imply the difficulties in combining three generations of DE pedagogy. The pragmatic issue in an appropriate combination of three generations of pedagogy is, on one hand, the approaches of each generation of DE pedagogy emphasises on different learning factors which are all necessary for effective learning; on another hand, DE contains a number of types cross different level of education and different models are applied into distance learning programme such as purely e-learning and blended learning. Without further contribution on how it can be applied for particular DE in practice, the idea of combining three generations of DE pedagogy can only be proposed. This thesis reviews the educational issues at postgraduate level and a particular interest on built environment drives current study in this field.

2.6.1 Higher education at postgraduate level

DE is delivered at different levels of education; these include: children's education at a distance; further education at a distance for vocational qualifications (distance training); higher education at a distance for university qualifications (university-level distance education); corporate distance training (in-house courses in which the public may not be invited to enrol) (Keegan, 1993, p.34). The educational objectives are different at each level and these objectives emphasise different skills and knowledge. Therefore, with regards to the differences between the levels of education, the research of students' learning activities needs to take into consideration of the learning experience at different levels of education.

Learners at postgraduate level are expected to achieve qualities and transferable skills such as: 'the exercise of initiative and personal responsibility; decision-making in complex and unpredictable situations; the independent learning ability required for continuing professional development' (QAA, 2008). This research focuses particularly on the learning effectiveness of distance students and their achievement outcomes at postgraduate level. Education is delivered based on the requirement of quality of higher education in the UK. The term 'Masters' is used in describing the characteristics of postgraduate education and it is considered (QAA, 2010, p.3) to be of the

> professional/practice' type often combining structured and independent learning methods alongside time spent in practice……a higher education provider feels are

important in defining the award, for example, the intention of the award or its relationship to further study or employment

The majority of students at postgraduate level in distance education are adult learners who are mostly employed with their own families. Their learning is impacted by existing knowledge, working experience and social life.

In the last twelve years, the number of postgraduate students in the UK has grown to 36% of the total undertaking higher education; of these, 68% are full-time taught postgraduate students and 43% of all taught postgraduates are international students (Smith, 2010, p.5). In addition, analysis of course web sites for UK provision indicates that 22% of all courses offer a distance learning option reflecting the statement of Williams *et al*. (2010, p.42) that, 'many HEIs have developed and are developing distance learning provision…'.

The total growth of internationalisation and the number of part time students at postgraduate level indicates the social demands for adult learning at workplace. Therefore, it is all the more important and urgent that distance education deals with existing problems and improves its quality. Appropriate theories need to be applied into practice. However, there are a number of barriers that restrict the development of theoretical principles in distance education at postgraduate level, for example, the nature of distance, the multi-influence on adult learning and culture diversity in international students. To achieving the education objectives at postgraduate level, researchers and educationists who work for theoretical guidance of DE delivery need to consider its specific features.

The characteristics of an adult learning environment are categorised by Kolb *et al.* (1999) as: giving and getting, experience based; personal applications, individualised and self-directed, integrating learning and living which is related to their goal of study of particular subject and learning about one's own strengths and weaknesses as a learner. Adults play certain roles in the society; distance education for adults contains a number of features of the society, such as, 'industrial-capitalistic; 'space-time distanciation'; disembodied mechanisms and expert systems; reflexivity; individual responsibility (Jarvis, 1993, p.168)'.To understand students' learning experiences at postgraduate level, the relevant influences must be taken into consideration.

To summarise, each level of DE education requires appropriate pedagogy. The educational objectives and growth of internationalisation of DE at postgraduate level require primary research of distance learning experience to deal with pedagogical dilemma. An investigation is required on the influences of existing learning capabilities and professional experiences on learning effectiveness need to be understood. On top of that, it is also essential to have an understanding on how adults critically evaluate their own learning.

2.6.2 Higher education in the Built Environment

Existing literature has shown research in distance education being conducted in some particular fields. For instance, the gap between 'what is being provided at a practitioner level and what is being researched by academics (Davis, 1996, p.26)' in management education; use of e-learning (Glen and Moule, 2006) and importance of the presentation of the resource (Draper, *et al*., 1996) in nursing education; and less effectiveness in learning of practice skills (Cornwell, 1998; Siegel *et al*., 1998) in social work education. The issue lies in the difference between the design and delivery of different subjects. It is significant to understand the influence of educational fields to students learning experience. This present research particularly focuses on distance learning in the field of Built Environment education.

Higher education in the UK is currently facing the changes caused by the economic crisis and its impact on the change of the tuition fees (BBC, 2011). '…built environment subjects and departments will also have to cope with change' (Williams *et al.*, 2010, p. 8). Williams *et al*. (2010) reported that there is a strong demand of postgraduate education in the field of Built Environment. Postgraduate courses account for around a third of all built environment higher education provision. There are 21 subjects summarised at postgraduate level and 16 subjects at undergraduate level. The more popular subjects in the Built Environment at postgraduate level are architecture, civil engineering, real estate, construction management, sustainable construction, construction management and project management (Figure 10).

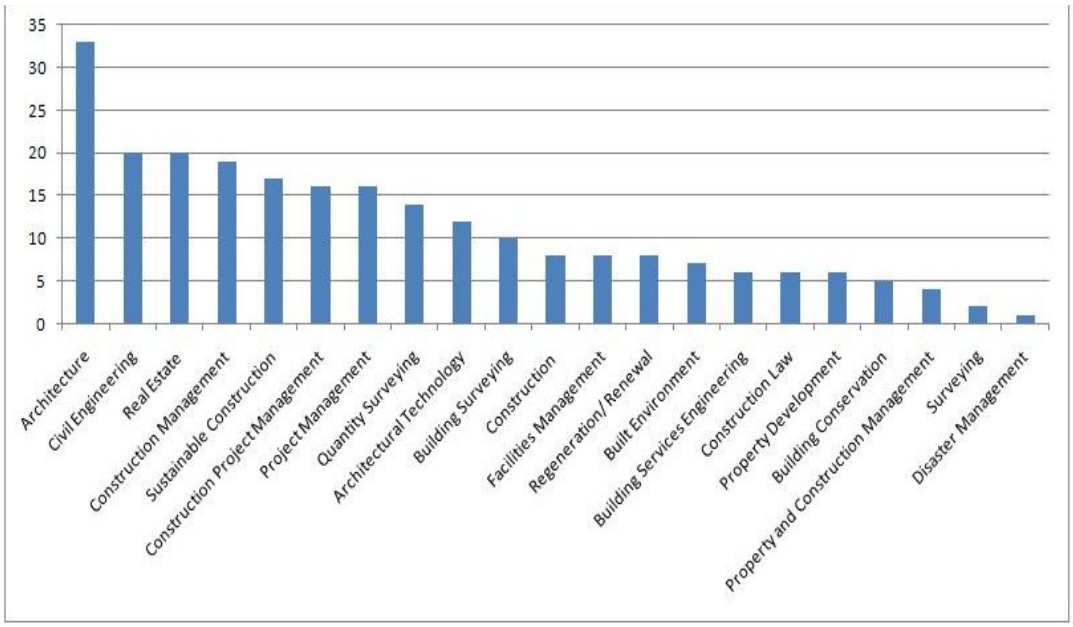


Figure 10. Frequency by subject of built environment postgraduate courses in the UK

Source: Williams et al., 2011, p.38.

Figure 10 clearly shows the diversity of subjects in Masters Courses in the Built Environment. Williams *et al.* (2010) suggested that the reason for the diversity of subjects at postgraduate level is,

> Postgraduate study is more specialised than undergraduate, building upon the broader discipline knowledge gained at undergraduate level, and branching off into greater refinement, so availing closer attention to specific areas (p.38).

In considering the feature of learners in the Built Environment, researchers found that learners from construction professions 'are constantly exposed to varying stressors in their working environment and are likely to experience a high level of job burnout' (Yip and Rowlinson, 2006, p.70) and these professions are not aware of the potential influences of the burnout syndrome. Burnout is defined as a syndrome of emotional exhaustion, depersonalisation and reduced personal accomplishment (Maslach *et al*., 1996). By learning through DE, students in the Built environment experience overstress in both work and study contexts.

In analysis, Built Environment education has the feature of inter-disciplinary knowledge and it is suggested that faculty members in Built Environment departments need to carry out interdisciplinary work (Wood, 1999). In addition, distance education in the Built Environment frequently involves cooperation with a professional organisation, for example, the Royal Institution of Chartered Surveyors (RICS) or the Chartered Institute of Building (CIOB). In 2010, there were 49 institutions in Built Environment education associated their course with RICS accreditation, and 15 of them were delivered through distance education (RICS, 2010). There are a total of 31 universities that provide courses accredited by the CIOB. Within all students at postgraduate level in the built environment, the percentage of postgraduate students who were entrants to RICS accredited programmes has risen from 47% in 2003/4 to 54% in 2007/8 (Laing *et al.*, 2010).

In short, DE in the Built environment has its particular features. Design of DE delivery needs to match these features. This study is interested on understanding how distance learners learn in the particular distance environment in Built Environment which provide inter-disciplinary knowledge and have cooperation with professional organisations.

2.7 Summary

The current chapter explains the background of this research project, based on a review of previous research in DE and the relevant issues in higher education at postgraduate level in the built environment. The research scope and objectives are defined for the primary research at the first stage which is attempted to understand students learning experience in distance learning environment at postgraduate level in the Built Environment. The critical review of

existing literature also contributes on the theoretical framework which guides the primary research in case study. Main elements of distance learning environment (role of tutor, learning support, use of technology and evaluation) became the main focus in understanding pedagogical design; and interactive learning and independent learning are considered in exploring student experiences. The details of data collection, findings and analysis of the case study are shown in the next chapter.

Chapter Three - Findings and Analysis of Initial Case Study

3.1 Case selection and data collection

3.1.1 An introduction to objectives of the case study

The initial stage of this study aims to achieve the following research objectives:

- To understand how learning experience is influenced by DE delivery
- To explore how students learn in DE
- To identify the key to distance learning success in the distance learning environment

These objectives were achieved through a case study research. Selection of research methods and the process of data collections were based on the purpose of understanding the distance learning environment from multiple angles, exploring students' interactive learning experience and students' independent learning experience. In addition, comprehensive analysis of the findings was carried out at the end of this chapter.

3.1.2 An introduction to the selected case

A specific case was selected for exploring the factors which impact on learners' learning in a complex learning environment. In other words, case selection was carried out based on the research objectives. Stake (1995) defines this as an 'instrumental case study'.

The selected case is distance learning programme in A School of the Built Environment (ASBE). The selected postgraduate programme of distance learning is 'professionally recognised by the Royal Institution of Chartered Surveyors (RICS) and the Chartered Institute of Building (CIOB)' (Document study). ASBE has been involved within built environment education for around 35 years and there are more than 2000 students currently studying in both undergraduate and postgraduate levels. Its distance learning programme started in 2006 and there are 212 enrolled students during the time (02/2010-09/2010) this initial case study was conducted. Findings from the document study show that distance learners in ASBE come from 28 different countries, and study on six separate pathways. The age of the student ranges from 23 years old to 60 years old with a 37 years gap in between.

ASBE distance learning programmes employs a 'blended learning' approach and it delivers the courses online with the addition of an annual on-campus conference. Fortunately, as noted by interviewee B, 'the dropout rate is very misleading in the way because that seems we lost

30% of students; but in fact, that isn't the true picture'. Therefore, the high dropout rate for distance learners mentioned in previous research conducted did not match with ASBE. As described by interviewee B, dropout rate in ASBE was less than 3% in the last two years.

3.1.3 Ensuring the quality of data collection

Newman and Benz (1998) suggest that the validity of initial case study can be improved by (i) using multi-research method and techniques, (ii) checking information with expertise, (iii) structuring the relationship between difference data sources in relation to the consistency of the research and (iv) using scientific methods to test the hypothesis. These suggestions were referred into current case study.

3.1.3.1 Selection of the methods

A good qualitative research will produce knowledge at different levels through triangulation and this is able to show different constructions of a phenomenon and improve the quality and validity of qualitative research (Flick, 2007). 'Triangulation entails using more than one method or source of data in the study of social phenomena' (Bryman, 2008, p.379). Multi-methods are used in triangulation research as the limitations of each method will be neutralised or their bias mitigated (Creswell, 2003). Selected research methods in the current adopted case study include document study, secondary research, interview and focus group. These methods aim to collect data to understand pedagogical issues in distance learning environment, to explore interactive learning experience and independent learning experience. The application of multi-methods is for understanding the key to distance learning success from different angles.

3.1.3.2 Avoiding disturbance

To achieve the validity for a case study, the ordinary activity of the case should not be disturbed (Stake, 1995). To avoid potential disturbance to the data from the institutional side, the following principles were followed for the data collection:

- Not to discuss the findings with relevant staff;
- Not to attend internal organisational activities about distance learning;
- Not to change research question and/or research activity because of any internal influence.

In addition, the challenge of avoiding disturbance on the data from students' point of view was also considered. The research objectives are focused on students' experience of using learning strategy. Their current knowledge of learning strategy and their distance learning experience are the knowledge which needs to be collected by primary research. To avoid

potential disturbance on students' current knowledge of learning strategy and their activities on retrieving learning experience, the following principles were followed:

- No changes were suggested to the programme;
- No relevant knowledge of learning strategy was transferred to the students by the researcher.

3.1.4 Ethical issues

Ethical standards of research have been designed into all the chosen research methods. This has included confirming participants' awareness of the research objectives and seeking their permission to collect data with consideration of data protection and participants' anonymity.

Firstly, all staff participants were made aware of the purpose of this research through a pre-meeting or email conversation. Students, however, were made aware of the detail of this research study from a presentation presented to them before data collection and at the same time a participant consent form was completed by all participants before data collection (Appendix 1) was carried out. Permission for audio recording was also obtained during interviews and focus group with permission.

Secondly, all data has been carefully protected. Documentations were kept in a locked space; electronic data has been installed in the NVivo© system and is protected by two layers of security: one being the computer's login password and another generated by the NVivo© system. On top of that, the audio recorded files were transferred to NVivo© after the recording and immediately deleted from the recording device.

Thirdly, the anonymity of participants in the initial case study has been carefully considered. All invitation email letters were sent to participants individually and privately and can only be accessed by the researcher. Furthermore, the name of the organisation is also kept anonymous. All participants are therefore assured of anonymity.

3.2 Study of the distance learning environment in selected case

3.2.1 Research methods used in data collection

In order to explore students distance learning experience to develop DE pedagogy, the first step will be to identify institutional influences. This requires an understanding of how DE is delivered and how that delivery itself impacts students' learning experiences. Tutors need to design learning materials with knowledge of the student cognitive process, learning habits and demands. For example, based on the earlier theoretical review, it is clear that the feedback delays can challenge the effectiveness of student-to-tutor interaction and restrict the guidance role of the tutor. However, the question of how this is managed in practice remains. Also,

learners' demands and experiences vary at different education levels. This leads to questions such as, 'How is learner support designed and how is technology applied in DE?' and 'How does this influence students' learning experience?'. To answer these questions, a deeper exploration of institutional influences on the student learning experience is required. Main issues which were explored to achieve the research objecitves include:

- Applied pedagogy
- The role of teacher, learner support, use of technology, evaluation
- Comments on students' performance and expectations in terms of the pedagogy

These issues were studied through unsolicited document study, staff interview and secondary research.

3.2.1.1 Document study

Document study is a method used in social research. Flick (2006) suggests that both solicited and unsolicited documents can be used in a research study which was applied in this case study. Unsolicited document are collected and studied in this section.

Initially, it was thought that there are, in ASBE, existing documents that were available for achieving research objectives. For example, a project report produced by the programme director was available for understanding theoretical principle of DE delivery; and a student handbook was available for understanding the issues of role of teacher, learner support and use of technology. These unsolicited documents were analysed to understand the distance learning environment and expected students' engagement in the selected case. The project report was written by the Director of Distance Learning programmes as an internal report of the school. This report reviews the operation of DE in ASBE from 2008 to 2009. It is named 'Developing and Managing Distance Learning' which includes the main themes of DE development, programme delivery plan and critical review of the delivery plan. In this research study, it was used to understand the design of DE programme in ASBE. Next, the student handbook, an internal document in ASBE, was designed for supporting students' learning experience. This distance learning student handbook includes an introduction to enrolment, assessment and support in ASBE and it was used to understand how ASBE encourages positive distance learning environment. In addition, student feedback was collected by ASBE in on-campus conference by the programme director on a regular base, which shows students comments on the advantage and disadvantage of distance learning, their learning demands and suggestions for improvements. The report of student feedback is a collection of their original comments. It was used to analyse the existing problems in ASBE in conjunction with the interview data.

3.2.1.2 Staff interviews

The problems of pedagogical operation in DE exist in the learning and teaching experience. Based on document study, the reasons for the problems in the students' learning experience needed to be understood. The study of the document found that students learning experiences are shaped by the DE delivery and applied pedagogy impacts on their learning through design, delivery and evaluation. Therefore, the problems from a teaching point of view need to be explored.

Interview was therefore selected as a suitable method to explore required knowledge from the experience of relevant teaching staff. There are different approaches on how an interview research should be conducted. Positivism underlies the use of structured interview, and constructionism is associated with 'open-ended' interviews which encourage greater interaction between interviewee and interviewer (Silverman, 2001). The aim of using interviews in this research study is to explore the existing pedagogical problems in DE operation. This requires the data to 'give us access to "facts" about the world' (Silverman, 2001, p.86) which suggests positivism. However, the aim of this interview is not only to explore the truth about identified problems, it also needs to explore where the problems lies. This requires the exploration of potential problems during the interview process, and also it requires the interviewer respect on the real experience of the interviewee. Therefore, semi-structured interview is adopted in this case study.

Emerging issues were explored based on the experiences of relevant staff by employing semi-structured interviews. Research questions were pre-prepared based on the following main topics:

- Interviewee's role in ASBE;
- Problems which need to be solved;
- What has been done for supporting learners;
- How to achieve effective distance learning experience.

Eight members of staff were selected as participants by snowball sampling. Snowball sampling starts from a particular respondent; the rest of potential respondents will be sampled by the suggestions of this respondent (Pole and Lampard, 2002). The selection of sample started from the designer and developer of the programme, and continued with programmer director, module tutor and administrative staff. Based on the responsibilities of each participant, the interview questions were focused mainly on the topic of learning support, interaction and improving effective learning experience. Based on prepared topic, research process was semi-structured. The details of the participants' profiles are shown in Table 1.

Table 1. The information on staff interviewees

Interviewee and Position		Time involved in DE	Questions mainly focused on
A	Strategy builder	Programme start till present	Programme strategy, issues in development and strategy for future
B	Operation director	Programme start till present	Model used for programme operation, issues in programme progress and students management
C	Module tutor and learning support designer	Programme start till present	Learning support design, communications and the difficulties in working experience
D	Senior admin	3 month after Programme start till present	Communication, students quarries and difficulties in working experience
E	Administrator	Programme start till present	Communications, students quarries, difficulties in working experience
F	Module tutor	Join the programme for one module	Teaching experience and opinions for learning effectiveness
G	Module tutor	Join the programme for one module	Teaching experience and opinions for learning effectiveness
H	Module tutor	Join the programme for one module	Teaching experience and opinions for learning effectiveness

As shown in Table 1, a relevant code has been set to each interviewee. There is a hierarchy in 8 interviewees. Strategy builder and programme director were involved in DE from the beginning and they have the knowledge of how DE programme was designed, operated and developed. Other interviewees have appropriate experiences of being involved in this programme. All participants of staff interviews are therefore qualified to the research of distance learning environment.

Interviews and document study provides the data in relation to the design of DE and its influences on learning experience.

3.2.2 Findings of the design of DE and existing issues

3.2.2.1 The distance learning environment in ASBE

The selected case (ASBE) employs a blended learning approach in programme delivery. Online-learning systems, work-based projects and on-campus conferences are combined simultaneously. The students of the ASBE programme study in a comprehensive learning environment which includes a balance of e-learning, workplace learning and on-campus

learning environments. Based on constructivism approach, students' collaboration and interaction is encouraged in group work for supporting learning efficiency and at the same time to reduce the sense of isolation. Module tutors are suggested to be involved in the discussion board on the e-learning platform for monitoring the learning process of the students.

Under the principle guidance, learning materials and DE system were designed before the delivery. Learner support was provided during the learning process, and evaluations were arranged after the delivery by the module tutors. Learners mainly learn flexibly in their own environment which is separated from organisational acts. Administrative support, tutor support and technological support were provided to bridge the separation of teaching act and learning act. The main elements if distance learning environment in ASBE are illustrated in Figure 11.

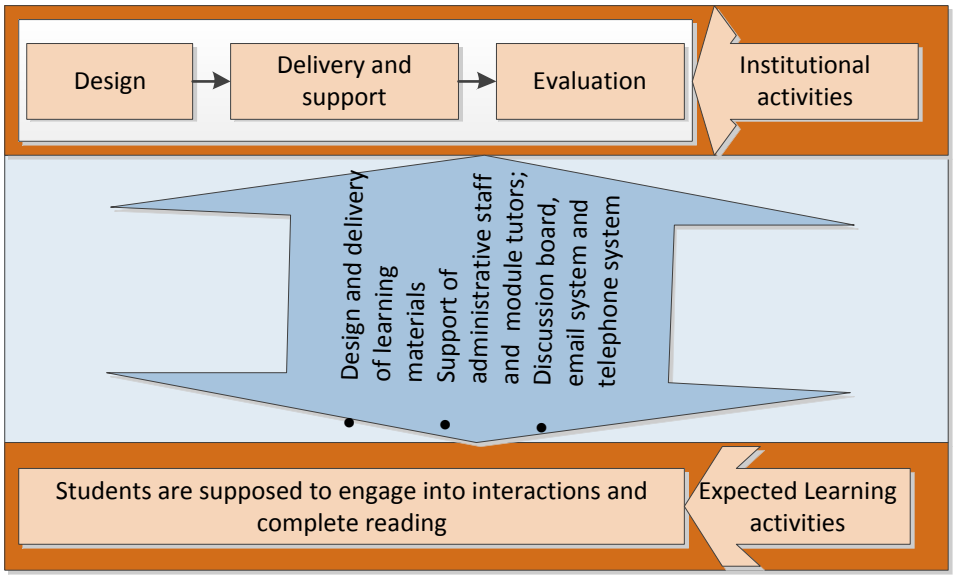


Figure 11. Distance learning environment in ASBE

Within the distance learning environment in ASBE (as shown in Figure 11), design of DE and student engagement which are expected from the institutions are reviewed in depth. This enables the analysis of how applied pedagogy impact on students learning experience. Findings are described as following.

3.2.2.2 Design of DE and expected student engagement

The design of DE and its operations are studied through the available documents and semi-structured interview to relevant staff. Main issues within DE delivery are studied, for example, design of learning materials, learning support, use of technology, role of tutors and evaluation. Details of the findings are described as following.

Provision of learning materials

Firstly, multi-learning materials are delivered to the students, such as, text books, module papers and online learning resources. The reading and learning is mainly guided by the module paper. Students are informed that 'each ten credit module in your programme will have ten module papers. For a twenty credit module, it will be twenty module papers' (document study: Student Handbook). The learning materials are made available to students either at the beginning of the module or within every four weeks. Students are expected to spend a minimum of eight hours on each paper on reading and learning. There are also encouraged to fully engage with their programme in ASBE by participating in additional learning activities through communication such as discussing on the discussion board and submitting their work on time (staff interviewee).

Role of tutor

Each module has a module tutor who is responsible for creating a learning experience that achieves the following:

- Delivers knowledge and skills through the module papers
- Develops your knowledge and understanding through supporting tasks
- Facilitates the engagement with other students to broaden your understanding through discussion boards
- Tests understanding through self-assessment activities (formative assessment)
- Assesses, through the setting of coursework and examinations, the learning outcomes of the module (summative assessment). It is this mark that contributes to the overall award

(Document study: Student Handbook)

In the design of the programme, module tutors are responsible for design and delivery of learning materials and to post announcements and answer questions on the e-learning portal. The supporting and monitoring role of the tutors are implemented through discussion board, email system, telephone communication and the opportunity of face to face meeting. Tutors need to support distance learning through interactions and monitoring of their learning progress. The learning outcomes finally are evaluated by the tutors.

Design and application of learning support

ASBE have provided a range of support schemes to students. This supports includes:

i. The support on reading and understanding the learning materials such as, supporting notes, directed reading and self-assessment tasks.
ii. A range of source is provided via library and website for further reading.
iii. Planning, setting and checking learning goals are suggested for maintaining motivation.
iv. For asking help and criticism, reducing isolation and improving deep learning, interaction is encouraged and supported in ASBE such as, 'talk to fellow students; talk to your tutor and talk to your friends, work colleagues and family' (document study: Student Handbook).
v. An on-campus conference takes place twice a year for promoting peer and student to instructor interactions. It supports students 'getting networked from the beginning' (staff interview). The on campus conference is optional. Approximately 42.3 % students attended on-campus conference in summer conference in 2010.

The improvement of learning support is based on the study of students' feedback. Because fo the changes of students demands in their feedback, instructors are unsure about the direction of improvement. One module tutor commented: 'I don't really think we understand clearly about how they feel'. Therefore, this causes difficulties in evaluating the level of satisfaction, effectiveness of communication and students' demands.

Use of technology

The theoretical principle applied in the design of learner support and the use of technology is to encourage interactions for better learning efficiency (Interview A and C). Technologies are widely used in DE delivery and to support interaction. The online system adopted is designed to deliver DE education in ASBE is called 'Blackboard' in ASBE. For support learning, technologies are designed as part of the learner support system in ASBE. Email systems and telephone are used for student-instructor interaction; discussion board is used for student-to-student interaction and blackboard (e-learning portal) is used for students to interface and learning content interaction. Additional technologies are used by individual module tutor. Students are expected to engage in interactions for effective learning.

The problems in using technologies are explored in ASBE. Staff interview found that the use of discussion boards and telephone systems aim to encourage interactions, however, these mechanisms have not been sufficiently used. In relation to what should be the done to solve that the problems of not using discussion board, one administrative staff suggested that staff need to engage into using provided technologies to guide and encourage the interactions. Quoting from staff interviewee D, 'from my point of view, I think blackboard is good…however, I don't think it is really leading students on the right direction… as it is not

very inviting and appealing to welcome communication…'. There was found to be a lack of knowledge amongst staff about the way students learn. Interviewee C said, 'discussion board, it is one thing what we do, we never find out an effective way yet…'and 'we assume we are doing the right thing, but in fact, we have not thought of what student want. Some interesting points they made about learning, maybe we should learn from ourselves'.

Student engagement and evaluation

The assessment regime in ASBE aims to 'enhance and test students understanding of theory and applied perspectives and enhance the tests to test students' ability to critically analyse and evaluate knowledge and theories'. Students are expected to prepare assignments with 'a heavier demand on your time' and 'completion of each module is signified by successfully submitting of an assignment' (document study: Student Handbook).

The findings of staff interview shows many students did not engage in the whole module as expected. Their study mostly focuses on the assessment questions or the requirement of the assignments. Most staff interviewees (interviewee B, C, D and E) are not satisfied with their engagement, they believe that the students should fully engage into the materials, not only pass the exams. How student engage into distance learning and how they prepare the assessment and assignment need to be understood from the research of student experience.

3.2.2.3 Needs of improvements explored from both teaching and learning experiences

Firstly, issues are explored in relation to the role of teacher. A study of student feedback found the problems with the design of learning materials and lack of feedback from tutors. On the teaching side, relevant members of staff were interviewed about their role and experience in DE. A lack of priority was stated by relevant staff, as 'you have on-campus students knock on your door, distance learners are sometimes not considered as they are not in front of you' (Interviewee F). To support the students, interviewee G mentioned that she/he always plans a piece of time in the diary to support distance learning students, and then she/he can make sure there is something can be done. On the learning side, the length of the module paper was frequently brought up as a problem. Some students have found it is difficult to complete reading as the actual time spent on reading is much more than the time suggested by the tutor. Also, the quality of the paper varies between modules. However, providing poor quality of the paper compromises but at the same time reduces students' motivation on learning but on the other hand high quality of the paper improves students' interests and increases their motivation. In addition, the existed problems in relation to tutor' role is the feedback problems. Students have different comments on the feedback. Some expressed their positive experience about the feedback as feedback received from tutors was supportive towards their learning progress and hence students were motivated. Some indicated that they almost never received

expected comments and/or feedback. The threats they generated in discussion board to ask questions are not answered by the tutor. A common issue has been found from the study of student feedback is the disappointment on feedback strongly impact on their emotion and thus reduced their motivations in distance learning.

Secondly, issues are studied in relation to the learner support and technology. From the tutors' point of view, staff interviews revealed the perception of lack of engagement by students in using provided support and technologies, such as interaction is suggested as a way to reduce feelings of isolation and improve learning effectiveness. Nevertheless, the provided support of interaction is not commonly used by the students, Data show that 'some students do not engage into interacting at all' (Module tutor B) and therefore relevant technologies are rarely used. The lack of engagement in using provided support is also found in use of supportive documents. Staff interviewee has indicated that some questions asked by the students are clearly explained in provided documents. On students' point of view, findings of studying the report of students' comments show that the improvement of the quality and quantity of the videos are preferred. The discussion board is cold and impersonal. One student prefer 'an informal networks e.g., private e-mailing to people familiar from the workshop days'. In addition, the adaptation of different technologies across modules produced considerable disturbs to study, one student comments that 'having too many areas to collaborate, would be better to have one single discussion forum on main pages'. Furthermore, feelings of isolation can be interpreted from the comments, such as 'more announcements' or notes from the tutor just to let us know they are checking in and there to keep us on track. This also shows the problem of lack of feedback in DE, and later responses also mentioned 'it takes a considerable time to get feedback prompt reply emails from tutors' (student comments).

Thirdly, students' engagement on learning is focused on preparing the assessment and assignment in staffs' opinions. On one hand, tutors are dissatisfied with student engagement; on the other, they are not aware of how student learning. When the quality of higher education is considered in relation to full engagement, it is important to know how student learn and the role of assessment and assignment in achieving expected learning outcomes. This is researched from student experience and analysed in Section 3.3 and 3.4.

3.2.3 Significance of the initial case study to researching pedagogical issue

This case study clearly shows the commonality of this case in the field of DE at postgraduate level in the Built Environment. The general problems in distance education operation that currently exist at postgraduate level in the Built Environment are found in ASBE, such as, student diversity and existence of pedagogical dilemma. A relevant research of student learning experience in this field is therefore significant for pedagogical develop in DE.

The findings show that pedagogic dilemma exists in ASBE which caused problems such as the lack of feedback, confusions of learner support, and mismatches in design of technology.

Firstly, the issue of distance learning in a conventional university existed in ASBE. Details of this type of DE are discussed in Section 4.2.4. Within ASBE, the lack of priority to distance learners is caused by lack of time in tutors' experience and the distance between teaching and learning. Therefore, this is a scenario which objectively existed in DE in ASBE. In other words, to understand the nature of DE includes understanding of the existence of feedback problem. The reality is that the attempts on enraging student contribution on interactions are restricted by the lack of guidance and inspiration of the tutors.

Secondly, the contradictory between the expected student engagement and their real learning experience is the problem of pedagogy. In ASBE, when the efforts of supports were not used by the students, confusions occur on how learning support can be improved and what is the best way to apply technologies. In fact, the basic reason for this confusion is lack of knowledge on how student learn. This again, proved the approach of pedagogical dilemma as discussed in Section 2.5.1.

Thirdly, the issues emerged in relation to student learning experience show the diversity of student learning habits and demands. For example, the technological skills and relevant needs on support vary, their comments on feedback include both negative and positive attitude, and their demands of learning are unstable. The various comments caused confusions to instructors about what should be done. An appropriate pedagogy is significant for guiding problem solving in DE practice.

In short, pedagogical dilemma existed in DE in ASBE. Instructors do not have the knowledge of how student learning. What should be the right thing to do is not clear to the teaching side. New knowledge on DE pedagogy is significant for instructors to improve the design of learning materials, to provide effective learning support, to design their use of technology and the evaluation. Therefore, to understand how students learn and what can be done to improve effective learning experience is required for pedagogical development. In this case study, a systematic investigation in student experience was carried out. The previous study has shown that distance learners mainly learn interactively and independently (see Section 2.4).The primary research of student learning experience therefore includes the investigation within both interactive and independent learning experience. The detail of research methods and findings are shown in the following section.

3.3 Research into the interactive learning experience

3.3.1 Data collection

Based on the existing knowledge of interactions in distance learning, three aspects are involved in previous discussions which include: student (peers), instructor (tutors) and learning content. The interactive experiences were investigated in this case study include the activities students token to interact with these aspects. Different research methods were used to collect the data of how and how often student attempt to act in the interaction with other students, with tutors and with the online system (ASBE deliver their materials online). These research methods are illustrated in Table 2.

Table 2. Research methods used in investigating interactive learning experience

Interactions	Research methods
Student to instructor	Solicited document: record of the communications called by the students to the instructors
Student to student	Document study, staff interview data and secondary research in the record of discussion board
Student to online system	Secondary research into the online statistics produced by IT system

Table 2 shows that solicited document study was used to understand student to instructor interactions. Document study, staff interview and secondary research were used to understand student to student interactions. Secondary research of online statistics was used to understand the interactions between students and the online delivery system. The details of data collection and relevant findings are presented one by one in the following.

3.3.2 Findings and analysis of student-to-instructor interaction

In ASBE, students are supposed to engage in interactive learning through provided technology and learner support are designed and delivered to the students. How students using these support in interactions is researched by the solicited document study, which aims to collect 'hard evidence' of how interactions occur between tutors and students.

3.3.2.1 Research approach and data collection

A form was subsequently designed to record the communications between students and relevant staff, which aims to explore how interactions occurring in the teaching and learning process (Appendix 2). The information which recorded in the form includes: time, type of communication content, forms of communication and length of communication time. Types of communication have been separated into 7 groups based on document study of previous

students' feedback. In total, four module tutors and two administrative staff took part in this research. The research was carried out for 12 weeks from the start until the end of the module. A total of 130 instances of communication were recorded during the twelve weeks of research. 77 of which were recorded by Administrative staff A and 30 instances were recorded by Administrative Staff B. The remaining 23 communications were recorded by three module tutors (one module tutor didn't complete this record).

3.3.2.2 Findings

The original data gathered from the participants was arranged and analysed through use of EXCEL©. Findings are described as analysed in this section. All figures demonstrated in this section are produced by EXCEL© based on the original data.

Firstly, the findings show that most interactions occurred between students and administrative staff. As shown in Figure 12, administrative staff A recorded 24% and administrative staff B recorded 59% communications. The total communications recorded by three module tutors is 17%.

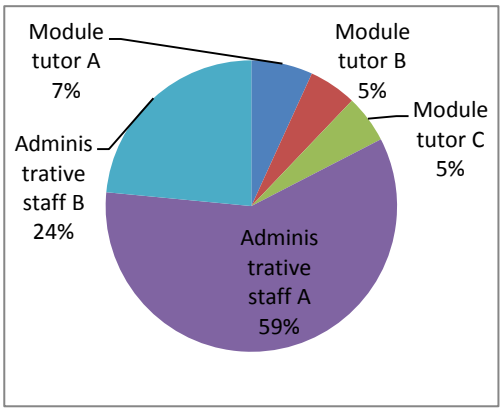


Figure 12. Record of communications between relevant staff and the students

Secondly, of these recorded communications, five were related to accessing online materials; 43 were for assignment, 10 for personal issues and 48 for other reasons (fees, DL seminars, exams, marks, etc.).No student has asked questions about understanding the learning content or problems on online communication. These findings (see Figure 13) show that the reasons for the students to communicate with administrative staff are mostly about non-academic issues and rarely relate to cognitive issues. In other words, understanding learning content had not been supported by human interaction between students and instructors.

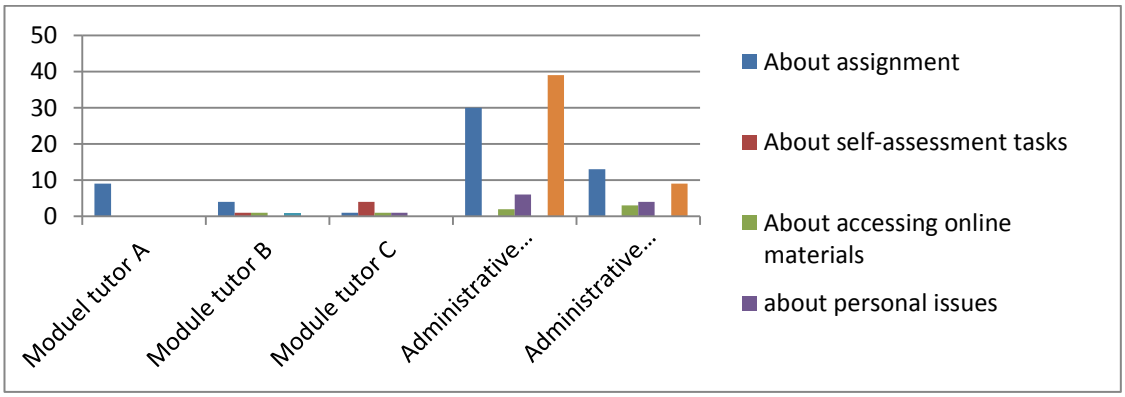


Figure 13. Content of interactions facilitated by provided technologies

Thirdly, 76% of the recorded communications were through emails, 19% were carried out by phone calls and 5% was done by other technology which evidently shows the student to instructor interaction was mostly facilitated by email system (see Figure14). The data show that the communications mostly happened though emails and phone calls. The findings have also indicated that students would tend to communicate with staff they are familiar with through phone calls and use email with the staff that they are not familiar. The evidence shows that module tutor B only had a phone call from a student and stated that 'students don't necessarily feel comfortable phoning me up if they never met me yet it would be interesting to ask student how effective the communication is'.

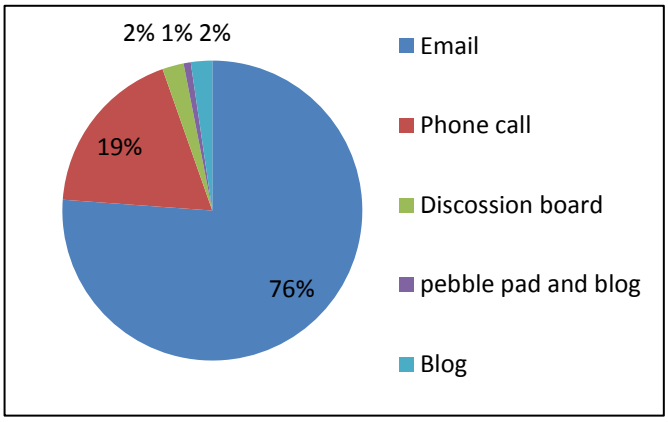


Figure 14. Technologies used in communications

Fourthly, the record of the activities students carried out to use technologies in communication was conducted over a period of 12 weeks. The recording started at the beginning of March and ended at the end of May in 2010. Communications were recorded three times in March, 71 times in April and 35 times in May. Notably, the total contact time in April is significantly higher than March and May. This figures (Figure15) indicated that students would rarely have any questions at the start of the course and it is at the middle of the course where issues regarding assignments and other factors causing the frequency of communication to rise.

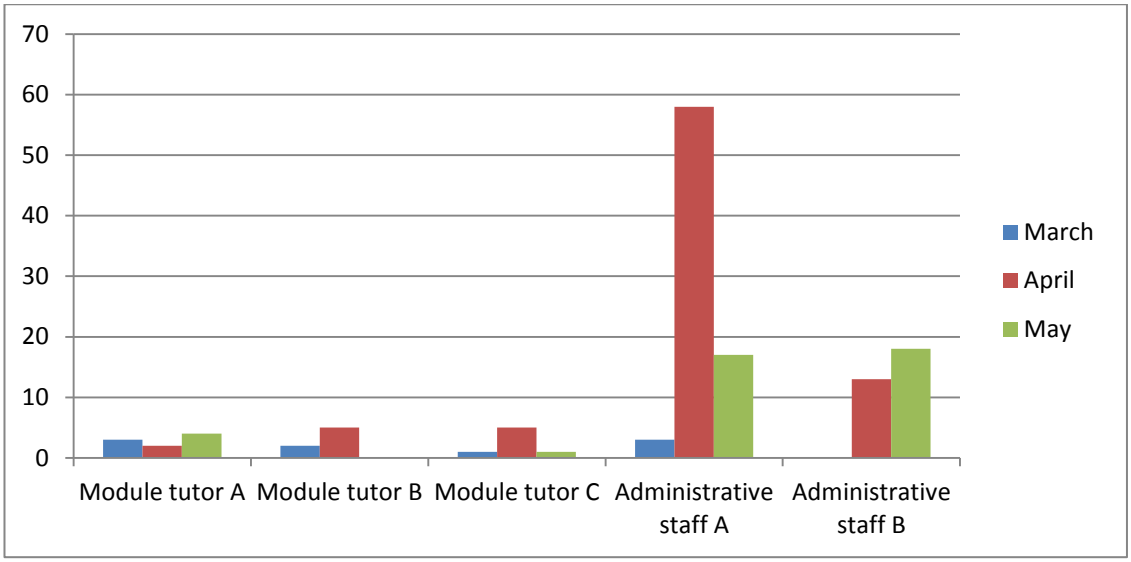


Figure 15. Communications within different stages of time

These findings revealed that students mainly contact tutors after the middle stage of their study which mostly was with regards to assignments. This shows that student-to-instructors interactions mainly occur because of the emerging needs in learning process, rather than being proactive to improving learning through interaction. In summary, the findings show that

(i) most communications were occurred with administrative staff;
(ii) most of communications are about non-academic issues;
(iii) most communications were under took though emails;
(iv) communications mainly occurred at the middle stage of the time for completing a module.

3.3.2.3 Analysis of the findings

In ASBE, students are encouraged to interact with the tutors by using email system, discussion board and telephone system. Through analysing the data, the tutor's role in academic support is hardly recognised through a total number of 23 communications with three tutors across 12 teaching weeks. Even though this can be explained by the support role of administrative staff, the role of tutors on academic support still cannot be replaced. The nature of feedback problems has been discussed in Section 2.3.2.1; it is further proved that tutors have fewer participants in academic support in ASBE.

In addition, students experience in using emails and fewer phones to unfamiliar staff shows a requirement of willingness and actions in the interactions. When interaction is demanded by the learner, it occurs based on their own effort to initiate a communication or it will not happen. The findings in this section show interaction is not a necessary learning activity. When it is supposed to be positive to learning effectiveness, its requirement on extra efforts and significance to cognitions need to be taken into account.

3.3.3 Findings and analysis of student-to-student interaction

3.3.3.1 Research method

Student to student interaction is analysed based on the findings of document study, secondary research into IT statistics in ASBE, and staff interview. The unsolicited document (Programme Report and Student Handbook) shows what engagement is expected and ASBE's support on student-to-student interaction.

In addition, secondary research was next carried out in analysing available data in the case study. Firstly, use of discussion board was generated automatically by the computer system in ASBE. Based on a permission of studying online information by the students, anonymous information in the discussion board is studied. Furthermore, student-to student interaction is analysed from relevant staff's experiences which mentioned in the semi-structured interview.

3.3.3.2 Findings

Document study found that discussion board was conducted for supporting student to student interactions. The design of discussion board was 'very extensively researched into', according to Interviewee A. The principle of the design was to help students both academically and non-academically. Use of discussion board aims to encourage student-to-student interactions based on the theories of interaction and collaborative learning. Module tutors are supposed to observe the discussions and to monitor their learning process. However, the data show that student-student interaction has not been carried out in system provided.

Less than 10% of the students contributed to the discussion boards (on-line non-participation observation). The discussion board which is designed to support student-to-student interaction seems to have failed. 'Some students prefer just to email one person directly to get the answer, rather than publishing it somewhere in public', interviewee G said, 'what I found is that the formal discussion board around support the learning outcomes of the module, student didn't engage it at all'. Interviewee C said during the interview that 'we always try to get students to be more active in discussion boards, but for some reason they do not seems to work in this programme.' In addition, Interviewee C, D, E and F indicated that the certain reason is students see contributing on the discussion board on certain topic has been considered high risk. Instead of using the provided system, they would prefer to communicate with peers in small groups in their own environment privately, rather than in the formal system. Interviewee B said, '…once they made contact in groups, getting each other's email addresses and they would communicate amongst themselves rather than in somewhere public where everyone can see...'.

In addition, student-to-student interactions were encouraged by the design of group work in one module. However, the tutor found that group work does not suit within the flexibility of distance education. Students complained that it is not what they wanted. The encouragement and arrangement of interactions between student and peers were not successful. Relevant staff considered that too much freedom in learning can cause less monitor in learning, therefore, students may go too far on a wrong direction.

3.3.3.2 Analysis and discussions

The findings show limited information in student-to-student interaction. To analysis the findings, the invisible interactions between student and peers are considered. It is aware to the tutors that most student to student interactions are outside of the system. However, how effective it is to the learning is uncertain. The findings show a contradictory between the freedom of student-to-student interaction and the needs of monitor tutor's point of view. In addition, distance learner need to balance learning and a number of factors in their life,

whether to participant into socialised learning environment is their own decision. The 'monitor' role of learning in student-to-student interaction is difficult to be addressed.

What is important is students are learning in their own environment. Improving understanding of knowledge through interactions with peers which happens between students within a shared learning environment does not automatically happen in day-to-day interactions in distance learning. The role of student-to-student interaction in distance learning should be re-thought.

3.3.4 Findings and analysis of student-to-screen interaction

3.3.4.1 Research method

Secondary research is carried out to understand how often student act on student-to-content interaction. The online frequency statistics which is automatically generated by the IT system is analysed. To determine the tutor's influences on students' learning experience, statistics from several modules that were running between January and June 2011 were selected. In ASBE, learning materials are released online but the release time varies for different modules. The assignments were arranged at the end of the study time. How frequently student used the online learning system are analysed based on a secondary study of the IT statistics. The findings are described in relation to how the particular module is delivered.

3.3.4.2 Findings of secondary study

Module A has assignments due in January and the result is released in March. As clearly indicated in Figure 16, the pattern in students' online activity peaks during the month of assessment and the month when results are released.

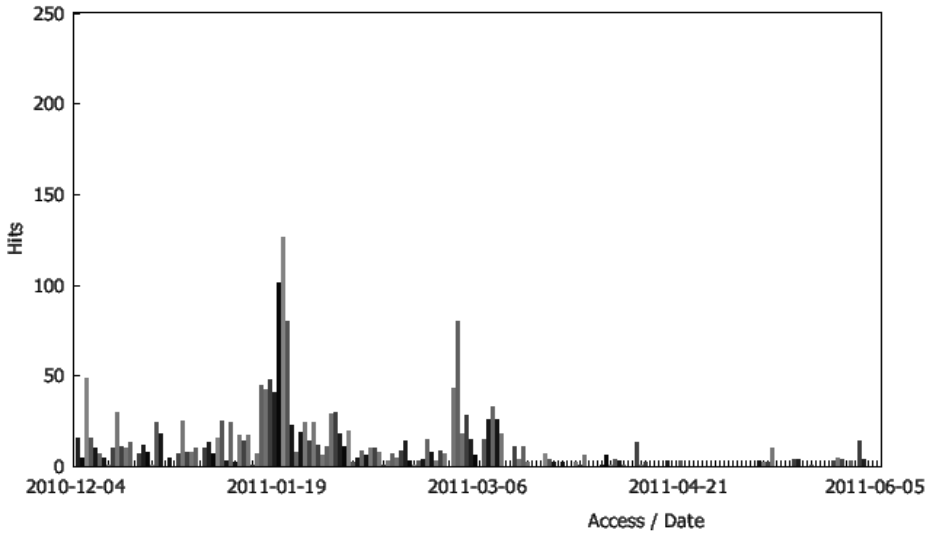


Figure 16. Total hits of Module A in the first half year of 2011

Module B started in Febrary 2011 and the assignment is due in June. Module materials were released every four weeks from the start date of the module. For this module, we can clearly

see a different pattern compared to Module A. As the course material is posted online every four weeks, students are required to access the e-learning portal on a more regular basis which can be seen from Figure17 below.

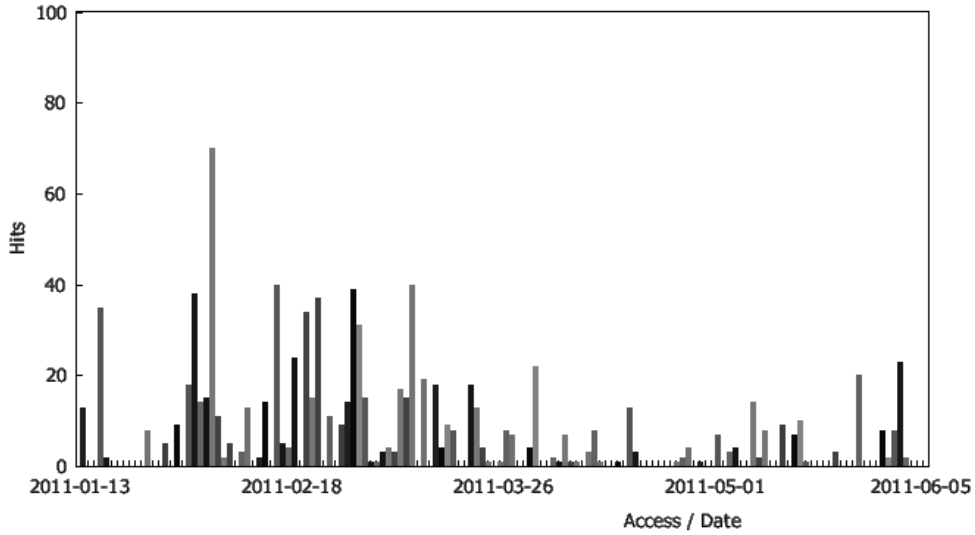


Figure 17. Total hits of module B in the first half year of 2011

Module C is a yearlong work based module and the deadline for the assignment is specified in September 2011. The frequency in Figure 18 shows that students visit the website over the semester time with hits of a higher and more regular frequency on average compared against other modules.

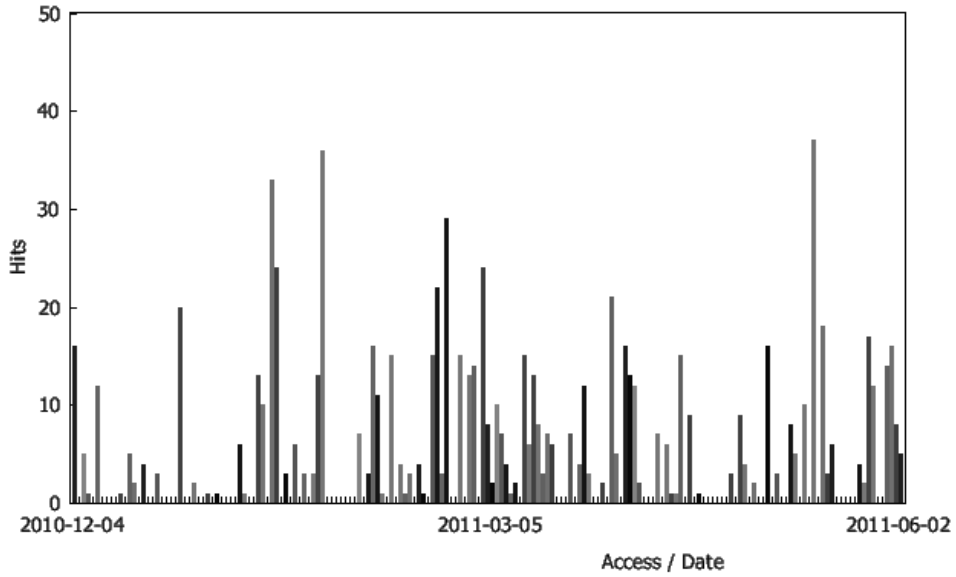


Figure 18. Total hits of module C in the first half year of 2011

Module D is a yearlong module which starts from September 2010 to September 2011. One assignment was scheduled to be due in January 2011 and one examination was scheduled in May 2011 (Figure 19). The statistics shows continue contribution of the students from January

to May and the number of the hits decreased in June. This shows that the students frequent the websites more often when an assignment or examination is due. In addition, the preparation of examination led the need for website support.

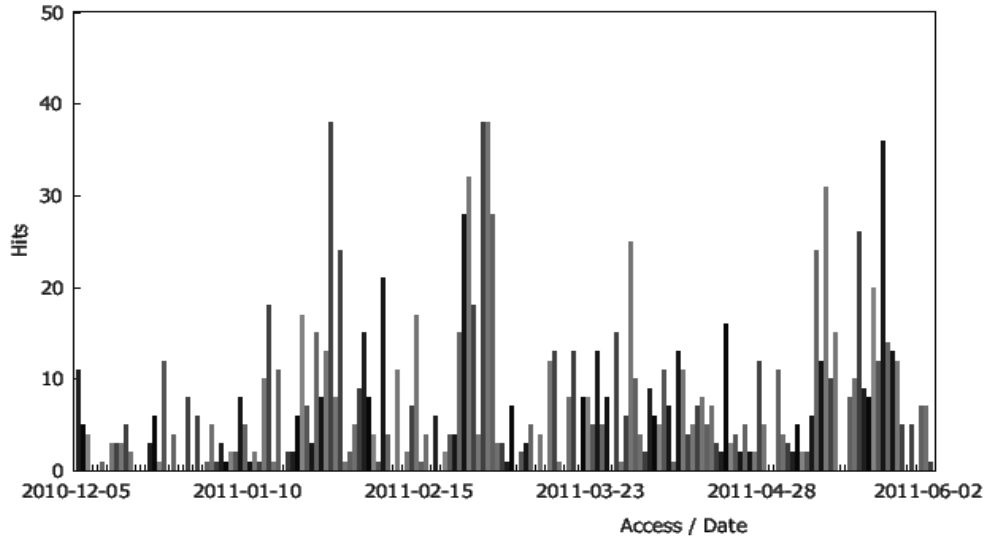


Figure 19. Total hits of module D in the first half year of 2011

Module E is a 10 credits module started from September 2010. The assignments are scheduled to be due in January 2011. The statistics (Figure 20) shows students mainly visited the website during the times when the assignment is due and when the result is released.

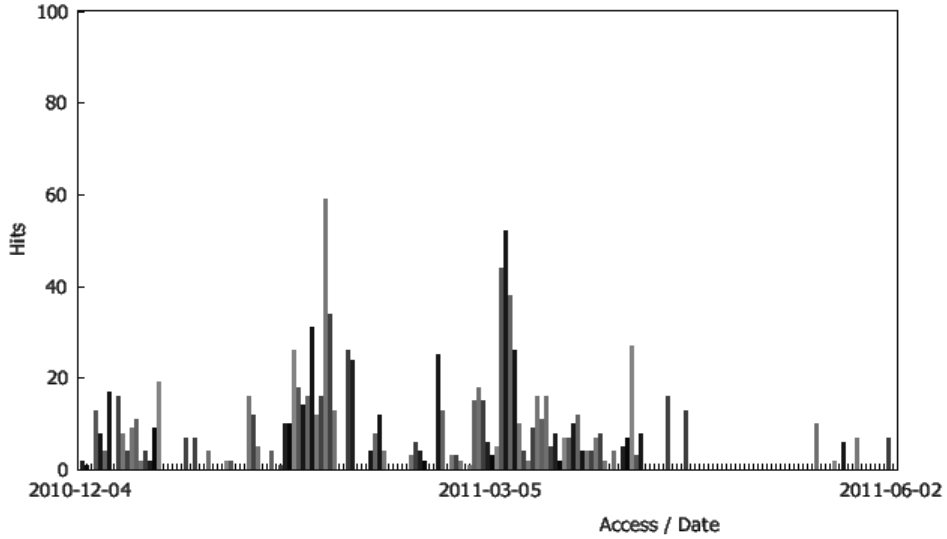


Figure 20. Total hits of module E in the first half year of 2011

Module F is a phased released module and the assignment is due for submission in January 2011. The statistics (Figure 21) shows that frequency of students visiting the website is very regular and consistent during assignment preparation and before it is due in January. The

number of hits fell significantly immediately after the assignment is due and it only started to increase slowly when the results are due to be released.

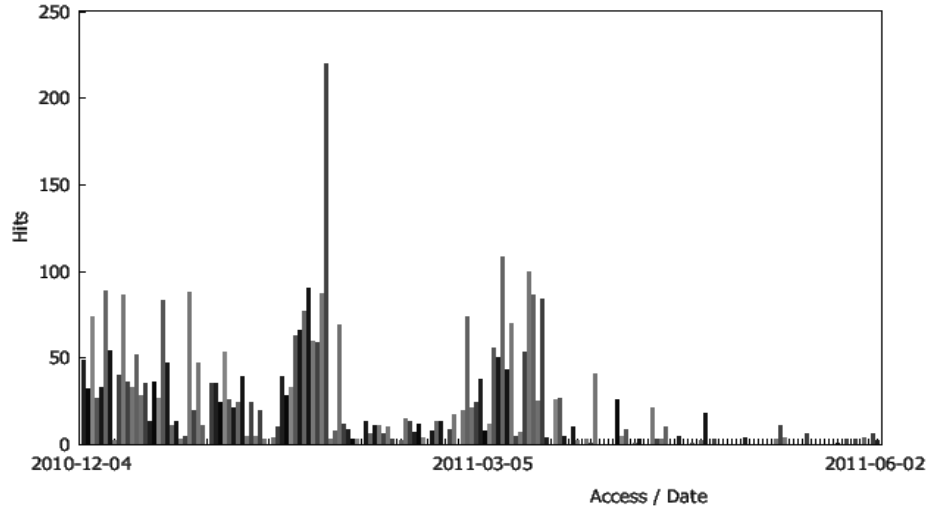


Figure 21. Total hits of module F in the first half year of 2011

3.3.4.3 Analysis of the findings

In analysis, the statistics have provided the evidence of how students' online learning experience is shaped by DE delivery. The findings of these statistics clearly revealed that student online learning activities are influenced by the schedule of releasing the module paper and the assignments. Students visit the study website mostly during the period when the paper is realised or assignments near due. The statistics automatically recorded by the online system show strong evidence of how DE delivery influences students learning activities. However, individuals' engagement into learning content is not discovered.

3.3.5 Summary of interactive learning experience

In summary, the findings of student interactive learning experience shows that distance learning experiences are shaped by DE delivery, however, it is not able to be controlled by the system. Findings and analysis of student to tutors interactions are less significant to academic development; student-to-student interactions are mostly invisible; and student- to-content interaction is shaped by DE delivery. The data suggests that interactions are initiated by the students. Their engagement in interaction based on their own willingness, it is less manageable by the institutions. In addition, the data show strong evidence that some students do not participate to the interactions.

The data discovered in regard to student interactive learning show limited information on how student learn and it is not able to analyse the significance of interaction based on those findings. Further study of distance learning experience is focused on their independent learning experience in the following section.

3.4 Research into independent learning experience

3.4.1 Data collection

3.4.1.1 Reasons for using focus group method

The knowledge of learning strategy was developed and/or selected only existing in students' own mind. Interview is ideally the appropriate method to collect the data of students experience and opinions. However, as the distance learners learn in their own environment, it was not feasible to get in touch with these students individually to conduct an interview under time and cost constraints. Focus group interview is therefore suggested as a solution in this situation (Flick, 2006; Bloor, 2001). The focus group method is an interview with several people on a specific topic or issue (Bryman, 2004, p.344). Its main advantage include that 'they are low cost and rich in data, that they stimulate the respondents and support them in remembering events, and that they can lead beyond the answers of the single interviewee' (Flick, 2006, p.190). In ASBE, students are invited to a two day on-campus conference. It was therefore possible to introduce this research study to a group of students at this conference and organise a focus group during the period to deal with the difficulties of conducting interviews with distance learners in terms of cost and time.

3.4.1.2 Design of focus group

Four groups were arranged with 7-8 members per group. To avoid over intrusiveness in the process of focus group, the discussion topics and purpose of this focus group was presented at the beginning and a guidance of group activities was issued to each group (Appendix 3). The process of focus group was designed into four steps:

Step One: Presenting the purpose of this research by the researcher

Step Two: Self-reviewing and recording learning experience based on a particular topic by distance learning students

Step Three: Group discussion of each topic

Step Four: Group presentation of what strategies are mainly used by group members

3.4.1.3 Topics involved for a comprehensive study

In order to have full knowledge of how student learn on their own, both positive experience and difficulties are explored. Therefore, two main topics are designed in focus group: first, students record their own positive experience, i.e., the things which worked well for themselves and they are willing to share with their peer group. Secondly, learning strategies are used to deal with the difficulties in learning experience, and it is impacted by motivations.

Motivation is a psychological factor and is related to students' emotion. How motivation is impacted by psychological dynamics, how it impacts on use of strategy, and what strategies student use in their experience are researched through five questions:

- What difficulties are you experiencing?
- What are the reasons for these difficulties?
- How do the difficulties affect your emotions?
- How do emotions affect your learning activities?
- What strategies are you using to deal with these difficulties and relevant influences?

3.4.1.4 Techniques used in focus group

A specific limitation of focus group is 'how to document the data in a way that allows the identification of individual speakers and the differentiation between statements of several parallel speakers' (Flick, 2006, p.199). In addition, significant data of each individual's opinions and experience could be or disturbed by interaction in group activity. For fully collecting the data and avoiding over-intrusiveness in the process of focus group, two record forms were used. Form A (see Appendix 4) was used to collect positive learning experience and Form B was used to collect difficulties, use of strategies and motivations (see Appendix 5). Students were suggested to write their own experience down before any discussion. This section demonstrates the details of data collection, findings and data analysis.

3.4.2 Findings of effective learning experience

The data showed that students' expressed positive learning experience contains how they manage a positive environment for study, how they manage the time for study, how they effectively read the materials, how they seek support and use technology, and finally how to complete the tasks.

These experiences are closely related to their experience of understanding and using learning strategies. For example, students stated that their positive experience which they want to share with others is 'applying theory to work situation', 'good to have assignments given plenty of time before hand in date to allow time to prepare' and 'in preparing of assignments, I will firstly write an assignment plan; secondly, followed by prepare and making a list of relevant books/literature'. These data show that students positively evaluate their experience of using learning strategies. The experience of using strategies is their knowledge of how distance learners should be for effective learning.

3.4.3 Findings of difficulties in independent learning experience

3.4.3.1 Difficulties in six groups of learning experience

The findings showed some difficulties in which students are experiencing in their learning. For instance, students' personal life disrupted their learning and it is difficult for them to balance both workload from their full time job and education; lack of communication and guidance are commonly experienced by participants; limited time to complete tasks and poor feedback makes the independent learning process more difficult. These difficulties which described by the participants are categorised into six different groups faced during DE learning activities and is summarised in Table 3.

Table 3. Difficulties in six groups of learning activities

Distance learning experience	Difficulties explained
Reading learning materials	Unable to access online resources and library resources, do not understand learning content on their own
Understanding learning content	Students do not have enough time to complete the required reading; become tired when working in front of the screen; interruptions/distractions due to family life
Working with provided support	Lack of communication; low accessibility of resources; isolation
Using technologies	Learning use of technology is time consuming; challenged by age; technological problems interrupt thinking; different technologies crossing different modules
Working with feedback	Obtaining feedback in time, learning is therefore having difficulties due to unsolved questions
Preparing for evaluation	Not understanding questions; high pressure due to limited time; clash with jobs; interruptions due to family life

The findings of difficulties in six groups of main learning activities are analysed and there are three key drivers which cause difficult experiences in distance learning: DE delivery, personal life, nature of DE and personal condition of learning.

3.4.3.2 Difficulties produced by DE delivery

Firstly, distance education delivery produced difficult experiences. The problems of DE delivery are discovered as a driver that drives these difficulties. For example, the purpose of using IT systems was not clearly stated and there is lack of instructions on how to use them; online resources such as, PDF paper and video, have the problem of accessibility, no material support, lack of communication, too many reading materials, and poor feedback received during the learning process. These generates negative feelings from the learners; for example,

‘emailing a tutor who is out of office for one month’, One student commented ‘It annoys me because distance students need as much contact as full time students but it does not seem to be like that’. This student felt he cannot keep up with the work. In return, the negative feeling ‘makes me disheartened, don’t feel like I am taken as seriously compared to full-time students’. Group presentations showed that poor comments were received and difficulties in accessing the resources cause confusion and unhappiness in learning. In addition, the confusion not only cause difficulties in understanding the learning content, on top of that it causes difficulties in moving on to next piece of work, assimilation of learning materials and limitation of time. These difficulties impact on students’ emotions and cause feelings of stress, demotions, confusion, annoyance and frustration. Hence, students use selected strategies to deal with these problems. In their opinion, work smart, be time-efficient, and focusing on expectations could be a solution to this problem. Students have also suggested that lecture support, peer support and video conference could be helpful. The influence of DE delivery is demonstrated by case one and case two as followings.

Case one: One student is ‘struggling using pebble pad’ because ‘not very much information has been provided on how to use it’. This again generates additional stress on their learning. The student stated that ‘sometimes I just give up on trying to use the programme as l end up thinking it’s a waste of time, where email would be simper’. Instead of using pebble pad, he/she ‘turn pebble pad off and work using email instead’. A solution to this problem is suggested by this student: ‘a class on how to use it in a seminar’.

Case two: One student indicated that, in responding to students’ questions, ‘tutors are taking too long to respond’. Student felt that ‘it annoys me because distance student needs much contact as full time students but it does not seem to be like that’. The student then ‘contact higher people’ to solve the problem. In relation to how this can be improved. This case shows that how student emotion is influenced by tutors’ response. Also, student needs understand the nature of distance learning. The institution is therefore responsible on providing knowledge on perspectives, skills and strategies of distance education. As discussed earlier, the feedback problem is caused by the nature of DE in sixth type of difficulties faced in DE.

3.4.3.3 Difficulties produced by the personal life

Secondly, interruption of personal life produced difficulties to learning. Personal life is described as one of the difficulties faced during the distance learning experience. Reasons such as busy personal and work life, laziness, problems in personal life, financial problems, poor broadband service at home, illness, business commitments, failing to see the full depth of the task set are some of the common difficulties faced. Doing distance learning within a busy life makes students feel ‘anxious because it’s difficult to fit in everything’, guilty about family and study, feeling overstressed and tired. These feelings contributes in make DE learning

more difficult: ‘lack of concentration on learning’, ‘effect on my motivation’, lack of time to study, difficult to balance work and study, difficult to maintain motivation, difficult to understand the full extent of the assignment task, distractions to learning, difficulties in accessing resources, and lack of stimulation. As a result, these difficulties would eventually impact on their emotions and cause feelings of anxiousness (‘because it is difficult to fit everything in’), tired, stress, guilt, demotion, pressure and inadequacy. These emotions impact on students’ learning activities, such as overpressure, (late return of assignments, no feedback) and therefore strategies are developed by students. This influence of personal life on student learning experience is illustrated by case three.

Case three: Because there is ‘too much pressure at work and study at the same time’, the student found it’s difficult for individuals to ‘balance work, family and study’. It impacts on student’s motivation and they feel ‘less motivated and frustrated’. Hence, he/she finds it’s difficult to hand in assignments on time. The strategy which is used to deal with this difficulty is ‘Reading during early mornings (between 00:00 and 3:00)’.

3.4.3.4 Difficulties produced by the nature of DE

Thirdly, the difficulties caused by the nature of distance education. The nature of distance education is described as the separation, feeling of isolation and lack of communication (Keegan, 1996). The problems caused by the nature of distance are described as ‘not in regular contact with others who are going through the same thing as myself’, ‘lack of stimulation’ and ‘lack of direct contact with a tutor’. These problems cause the difficulties of self-learning, experience of isolation, and getting stuck in areas of study. Students experience distraction, tiredness, and boredom, which cause feelings of guilt, stress and demotions. These negative feelings ‘reduce assimilation of material and lose any interesting in materials’, one student responded. These difficulties cause the feelings of boredom, ‘creates negativity-feel like I can’t cope/keep up with the work’. Interactions are developed to deal with these difficulties, for instance, going to pub, discussing issues with other DL students, emailing others within their company on some course and speaking to others in the work-place. The influence of the nature of DE on learning experience is demonstrated by case four.

Case four: distance learning environment has the nature of easily by distracted, learning with job and family responsibility. This causes psychological influences. One student expressed that distraction, tiredness, and boredom of their experience caused feelings of guilt, stress and demotions. These negative feelings impact on their learning activities and ‘reducing assimilation of material and reduce any interest in materials.’ To deal with the difficulty of maintaining motivation, he/she strategically regulated the study by ‘have a specific place to study’, to reduce distractions of learning, for instance, switching off the TV/movie. Also, the

tactic of planning is used to ‘creating a routine time to study; breaking tasks into smaller steps. In addition, setting personal goals is used by this student as well.

3.4.3.5 Difficulties produced by the personal condition of learning

The findings indicated that personal condition of learning was one reason of the difficulties. For instance, some students benefit from the convenience of technology when the others are struggling. Both focus group and secondary data show that those students who had negative experience pointed out that there were too many IT systems to learn in the course. Applied technologies are difficult to use for these students. The difficulty of using the technologies make those students feel confused, frustration due to time spending and one student even found that it ‘irritates me and I get stressed because this should have been explained correctly and we should have been provided with a guidance pack on how to use’. Students have suggested that ASBE should arrange seminars on how to use the systems. However, the findings also show that some students used technologies to effectively support their learning and there is no negative influence of applied technology in their comments. These findings show that students’ technology skills are on different levels. Students who have lower level of such skills are more likely to experience difficulties and suffer from negative emotions.

The influences of individual condition of learning were also discovered from their use of learning strategies and psychological impacts. The findings show student experienced psychological influences on different levels. Also, the findings of their description of learning strategy suggest individuals have different knowledge, skills and perspectives on the reaction of difficult experience and psychological influences. Therefore, the condition of learning is the fourth reason of student difficult experience.

3.4.3.6 Analysis of the development of learning strategy

To analyse, focus group was held and the findings showed that the difficulties in learning experience cause the change of psychologies of distance learners. Those psychological dynamics include the feelings of being: anxious, stress, pressure and less-motivated, confused, frustrated; get stuck in areas of study, isolation, unhappiness. It is therefore difficult to move on to something else. Those emotions impact on their learning, make learning more difficult, and lack of concentration on learning. They experienced ‘inefficiency of learning, stuck in a same module, and disincentive in learning’ (students’ self-record).

Psychological problems mainly reflect on motivation and cognitive effectiveness. This has been investigated by educational psychologists (see literature review of early section). Findings show that some scenarios occurred in students’ experiences and this causes difficulties in learning and negative emotions. As a result, their level of motivation and learning efficiency are reduced; students hence develop their learning strategy to maintain

their motivation and to improve learning efficiency. These influences on learner's psychology on learning activities can be proved by data analysis of several individuals' experience.

In summary, students' personal life, DE delivery, the nature of distance education and personal condition of learning affect students' activities of using strategies in their learning. The particular scenarios of these influences produce psychological dynamics which reduces students' motivation and cause difficulties in distance learning. Students hence develop strategies for their learning success. These influences are displayed in Figure 22.

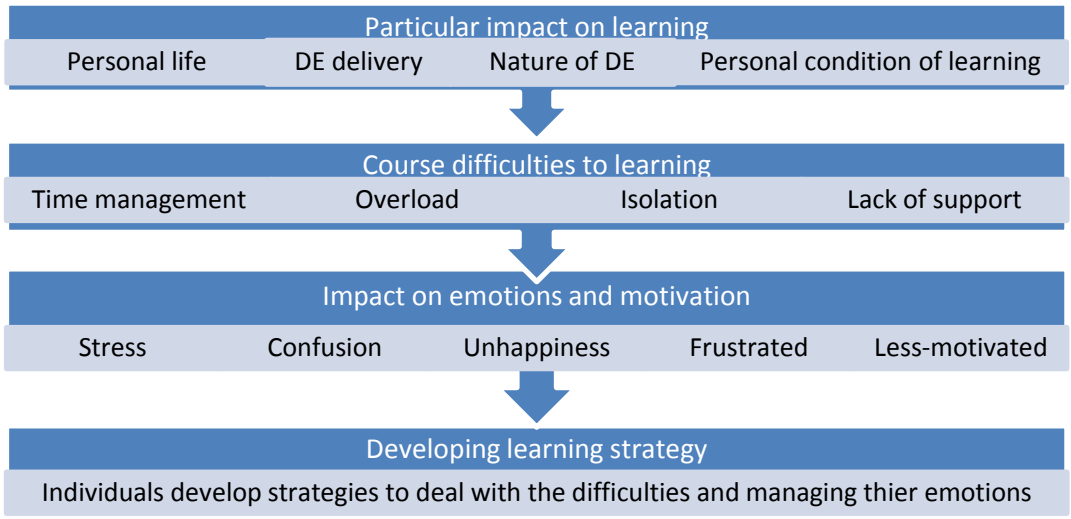


Figure 22. Development of learning strategy in DE

The above figure provides a systematic view on the development of learning strategies. Referring to this model (Figure 22), the knowledge of what and how strategies are used will provide possibilities in analysing students' difficult experience and the reasons which caused the difficulties. This facilitated the analysis of the role of learning strategies on dealing with difficult experiences in Chapter Five.

3.4.4 Findings of learning strategies used in dealing with difficulties

The participants reported the strategies they used in dealing with difficulties and improving learning efficiency. All data presented as the narrative of their own experience. Similar experiences from different individuals were clustered into a number of categories. This section analyses the findings on how student use learning strategies and relevant issues in their autonomous learning experience. The strategies explored from focus group interview, the reasons for students to use learning strategies, their actual activities and the objectives of using strategies are illustrated in Table 4.

Table 4. Why and how strategies were used by the students

Strategies selected	Reasons for using strategy	Activities carried out	Aims of strategy
Time management	Busy life; Full-time job	Creating timetable; balancing time; Getting up at early morning	Complete reading materials
Planning Print out learning materials	Time limitation and 'huge' amount of reading	Printing out learning materials; Creating routine time to study;	Complete reading materials
Reflection; Interaction; Seeking support; Resource management	Lack of stimulation; Less material support; Lack of communication; Feelings of isolation	Meeting with peers; Applying theory to work situation Using discussion boards to clarify points; Sending emails to instructors; Online interaction with peers; Talking with family members; Using video lectures, Attending provided workshops	Maintaining motivation
Environment management; Time management; Task break	Social influence	Reducing distractions of learning, for instance, switch off TV/movie; Revising finding right environment; Break tasks into smaller steps	Maintaining motivation Reducing disruption
Key point taking; Time management	Overload of work	Focusing on core materials; Studying at a certain time	Balancing workload and study
Resource management	Later or no return of feedback	Contacting higher people; Visiting university more often	Reducing confusion
Planning; Time management	Time limitation in preparing for evaluations	Preparing assessment /assignment earlier	Complete task in time

As shown in Figure 4, time management and planning are frequently mentioned and used by the students in focus group. Students stated that their personal life is busy and it is difficult to manage time for study. Some individuals are working full-time and some of them have a heavy workload. Thus, they do not have enough time to look at full learning resources. By using the strategies for managing time, students try to complete their study task in a required timescale. Time management and planning are the strategies used to deal with these difficulties. The activities students does in their management of time includes: reading the papers on a daily basis; creating a timetable and time balancing, getting up in the early morning; 'to fit in the required time I ensure that I cover around three papers per week',

creating a routine for study; breaking down tasks into smaller steps. Time management and planning are also used for preparing assessments. For example, students would start the preparation early rather than leave it until the deadline is round the corner as one commented that it is 'good to have plenty of time before the hand-in date to allow time to prepare'.

Attention focus and environment management were used to manage social influences which disrupts learning and reduces motivation. Students use environment management to focus their attention on study: such as 'having a specific place to study', to reduce and avoid distractions towards learning, for instance, 'switching off the TV/movie' and 'finding the right quiet environment'.

Key point focuses on printing out learning materials and breaking down the tasks were used to balance workload and the study. 'My mind tends to be on work problems and then I'm not concentrating on my studies properly because I'm too worried about work problems', one student responded. Their strategies to deal with difficulties include: focus on core materials; and studying at a certain time (for example, early morning or night time). To effectively and efficiently complete the learning materials, students print out the material to read. 'Once I had printed the notes I found it is easier to read the modules', one student said. They also 'break the tasks down into small pieces'.

Interactions, seeking support and reflection were used to deal with lack of stimulation, less material support and lack of communication. 'Studying alone can be demoralising when you don't have a group of peers to interact with'. Also, feedback is expected to reduce confusion of learning, but however 'this is not done in time'.

Interactions and seeking support were used and the activities of students taking parting this strategic learning includes: interacting with peers (they go to pubs and discuss issues with other distance learning students by email to help each other); using discussion boards to clarify points; sending emails to course supervisors and organisers when they have questions; also using of blogs and forum sections, 'if I have questions I will generally email the relevant module tutor'. Apart from interacting with instructors, students also seek support from peers, family members and colleagues. In addition, reflection is shown as a strategy in understanding the learning content with one student pointed out that his strategy is to 'apply theory to the work situation'.

Resource management was also appeared from students' experience. Institution-provided resources are optional for students to learn more effective. Some students strategically use these resources in their learning. For example, 'videos are supportive for learning', 'visiting the university more often', and 'attending semester conferences is helpful for preparing

assignment, learning and technical support'. Furthermore, human resource is also considered in their experience by 'contact higher people' to obtain expected support.

The findings show that some students combine the tactic of planning, controlling of time consuming and cognitive efficiency strategy to improve the effectiveness in use of time. Such as, breaking the task down into smaller pieces and starting it early; and 'try to plan times I can devote to learning', 'plan it into a short time and make it more important'. These strategies involved the combination of the cognitive strategy and metacognitive strategy. Focus group findings show that individuals combine the strategies differently based on their own situations.

3.4.5 Summary of independent learning experience

In summary, students' personal life disrupted their learning and it is difficult for them to balance both workloads from the job and study; lack of communication and guidance are commonly experienced by participants; limited time to complete tasks and poor feedback makes the learning more difficult. As a result, their level of motivation and learning efficiency are reduced. Hence, students develop their learning strategy to maintain their motivation and to improve learning efficiency. In addition, the level of motivation affect students' activities of using strategies, also, use of strategies is found to be the way students maintain their motivation in this research. The findings of student independent learning experience show that learning strategy is essential for students to deal with the difficult experience.

3.5 Comprehensive analysis of findings

Pedagogical dilemma which was identified in the beginning of this thesis was found in ASBE. This can be proved by the two barriers of pedagogical development. Firstly, there is a lack of theoretical principle in designing of learning materials, learning support system and use of technology. Secondly, there is a lack of knowledge of learners and learning experience on teaching side caused the confusions on students' demands. Pedagogical dilemma caused the mismatches between the expectation of the instructors and actual learning activities in student experience. The findings show these mismatches produced confusion on teaching side. Understanding of the reason for this mismatch requires an overview of the findings of how students learn.

3.5.1 Human interactions were used as strategies

On one hand, learner support is provided by tutors and administrative staff. Students are suggested to communicate with the administrative staff for the first protocol. Module tutors, administrative staff and programme directors work together as a team in supporting students. However, this case study did not find that human interaction is the key for distance learning.

Firstly, existing statistics and the communication record data showed that technologies which are used in facilitating interactions have not been utilised much in ASBE. Some students have never used them in their learning experience. Secondly, student-to-support team interactions mainly occur between students and administrative staff and the support given were mainly non-academic issues. This shows that human interactions are less effective for academic effectiveness. Thirdly, student -to-student interactions are mainly invisible to the instructors as their activities are outside the controlled system. This indicates that the 'monitoring' purpose embraced in supported system is largely reduced. Fourthly, interview data show that students' engagement in interaction activities do not predict higher mark. To summarize these findings, learners do not mainly learn through interactions and interactions do not necessarily cause higher learning outcomes. It is not necessary for students to carry out interactive learning.

On the other hand, students seek support to solve questions raised during self-learning. For example, seeking support from peers, instructors, or colleagues. In other words, student-to-student interaction, student-to-instructor interaction and student-to-colleagues interactions are used to seek support. These support were sought for solve the psychological, cognitive and organisational problems (i.e., feelings of isolation, questions on learning and questions to DE system). The selection of interactive learning is decided by students' motivation and based on their selection of learning strategies. The relationship between difficulties in DE, use of strategy and interaction is designed in Figure 23.

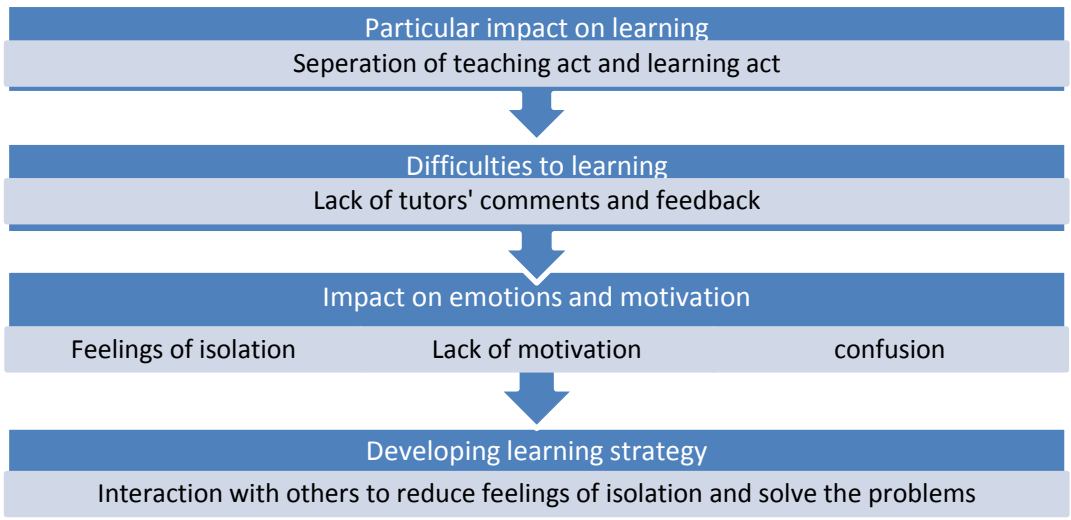


Figure 23. Using interaction as a learning strategy

Within Figure 23, the impact on student experience is the separation of teaching act and learning act. This causes lack of tutors' comments and feedback to the learners. As a result, students feel isolated and their motivation is reduced. Also, as the answers to their questions are not clear, they are confused about what are the right answers. To solve these problems and

to maintain motivation, the learners use interactions as learning strategies. Therefore, it can be said that interaction is a learning strategy used to seek appropriate learning support at postgraduate level. What is important is that, it is not necessary for all distance learners to learn through interactions and the form of interaction is selected differently between individuals.

3.5.2 Iceberg of the knowledge of independent learning experience

This initial case study found what students mainly learn independently and their independent learning experiences are much more than what the support team can see and those invisible scenarios impact on continuing learning activities. In the process of distance learning, learning activities and psychological dynamics (for example, satisfaction and motivation) is not visible to the instructors. This can be represented as an iceberg in the awareness of students' independent learning experience. The unexplored independent learning experience causes less consideration in students' difficult experience, over-pressure, manageable emotions and using strategies. Even through cognitive support was suggested previously, a complex psychological design is absent in practice. The iceberg of the knowledge of students' independent learning experience is therefore pointed out in this section (Figure 24).

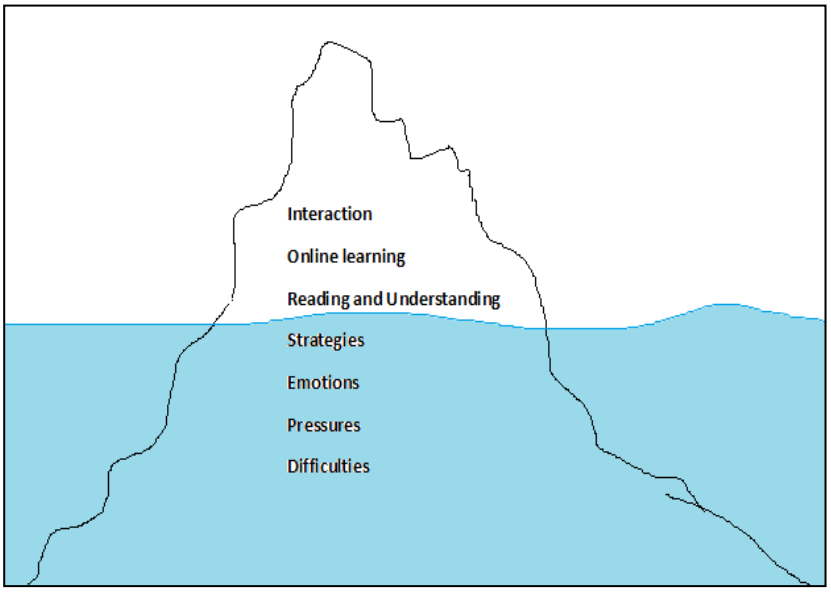


Figure 24. The iceberg of independent learning experience

The 'iceberg' of the knowledge of how students learn independently as shown in Figure 24 demonstrated that the amount of student experiences which are unknown to institutions is far more than the amount of what they can see. Some learning activities in DE are known by the instructors, for example, student-to-instructors interactions, the interactions appear in the online system (such as discussion board), and required reading and understood knowledge. However, what and how strategies are used by the students, emotional influences, pressures

and their difficult experience are unknown. The amount of students' learning experiences which is invisible need to be realized and discovered.

3.5.3 Identifying main learning activities in student experience

Based on the findings of programme delivery and its expectations on student performance, organisational influences on student experience occur based on the applied theoretical principle. When particular theory is selected, students are expected to learn in a certain way. Findings show that institutional activities shape students learning activities by the design, delivery and evaluate distance learning. Institutional activities in three stages of DE delivery require and/or expected students' engagement. These influences are analysed as,

- Based on the first step design of the curriculum and learning material, students need to understand the learning content and engage with learning material.
- Based on the second step, learner support system is delivered, students learn and seek relevant support for their own learning, and technologies are used as designed in the programme. Also, it is necessary for students to react with the tutor's feedback.
- Finally, following the final step of DE delivery, students need to learn and prepare the evaluation (assessment /assignment).

According to the programme design, students need to react on the aspects above. Therefore, six groups of learning activities which defined based on literature review are proved as the main learning activities in students learning experience in ASBE (Figure 25).

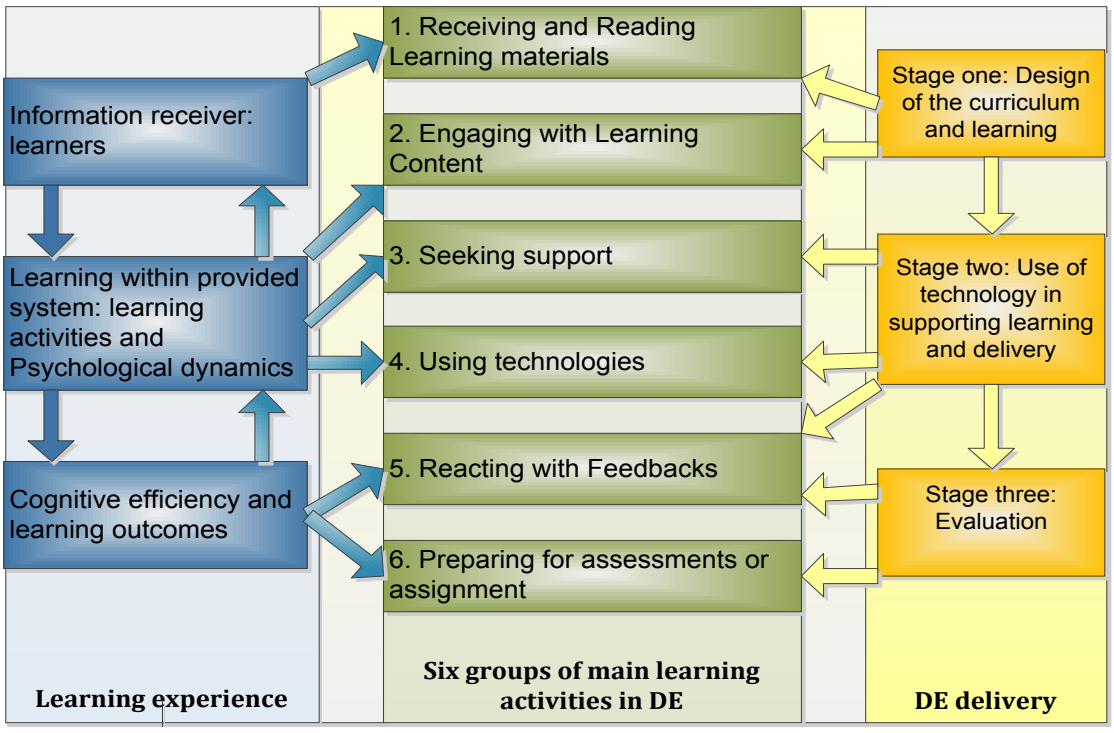


Figure 25. Six groups of main learning activities shaped by DE delivery

Figure 25 shows six main learning activities in DE. i.e., reading module papers, understanding learning content, seeking learning support, using technologies, working with tutors' comments and feedback, preparing the assessment/assignment. The defined six groups of learning activities are suggested for further research to discover the 'iceberg' of student experience in DE and it contributes on the development of the instrument which will be used in second research stage. This is shown in Section 4.4.4.

3.5.4 Pedagogical influences on main learning activities

Within six groups of learning activities, students learn with provided materials and support. Their learning activities are closely related to the pedagogical design of DE delivery. This section includes the analysis of how each group of main learning activities is impacted by organisational act through tutors by learning support and use of technology. This is shown in Table 5.

Table 5. Pedagogical influences on learning experience in ASBE

Pedagogical approach		Social construction		
Pedagogical application		The role of tutor	Learning support	Use of technology
Expectation to six groups of main learning activities	1) Reading learning materials	The amount of reading and the form of material	Multi-forms of materials Guidance notes	Online resources
	2) Understanding learning content	The level of difficulty, the cognitive design	Guidance notes	Video
	3) Seeking support	Provide support	Administrative support On-campus workshop	Discussion board Email system Pepped
	4) Using technology	Select and apply technology for supporting purpose	IT support	Selected and designed the use of technologies
	5) Dealing with feedback problems	The speed and content of response	Administrative support	Using technology
	6) Preparing for evaluation	Design the form and questions of the evaluation	Administrative support On-campus workshop	Online submission system ; online resource s

To explain the table above, the applied pedagogy in ASBE is a social construction and it is applied into three stages of DE delivery which impacts on six main learning activities. The influences of applied pedagogy to student experience are addressed in terms of the role of tutor, learning support, and use of technologies. In the first learning activity, the content and amount of reading is designed by the tutor. To support students in reading these materials, guidance notes and multi-forms of materials are provided which include online delivery. As a result, students need to read the required amount of material with the provided support. The second learning activity requires the student to understand the learning content. The level of difficulty within the learning content and the level of difficulty to read the materials were decided by tutor's design. To supporting students in understanding the content, guidance notes and videos are provided. Within the third learning activity, students need to use provided support to complete their learning. The support function was designed into every factors of DE, i.e., tutor's role, learning support system and use of technologies. This includes tutors' support, administrative support, cognitive support and technological support. Students need to seek support from those provisions. The fourth learning activity requires students to use technologies in technology enhanced DE system. Apart from the main IT system, tutors would select a particular technology for their own module. There is also a dedicated team of IT support services to support students for their learning using technologies. By using these technologies and support provided, students are supposed to participate in interactions. For the fifth learning activity, students need to deal with the feedback problems in sixth type of DE learning activity. However, the tutor's role directly relates to the function of feedback. What and when speed student get the feedback depends on how efficient the tutor respond to queries. In considering the limitation of tutor's time in sixth type of DE, administrative support was provided in ASBE. Within the sixth learning activity, students need to prepare assessment/assignment. The questions of the assessment/assignment were designed by the tutors. In addition, administrative support and on campus workshops were provided to support the preparations. Online recourse and online submission system were also provided to students.

In short, Table 5 demonstrated the influences of applied pedagogy on students' experience. To improve DE delivery, those pedagogical influences need to be taken into account of considerations. According to Kolb (1977, p.7), 'individuals shaped by social, educational and organisational forces develop increased competence in a specialised mode of adaptation' (Kolb, 1977, p.7). On the teaching side, pedagogy is the guidance of the actions of instructors, design of learning support, and use of technology. On learning side, design of DE delivery influences and shapes student experience. To realise the pedagogical influence on learning experience is important in developing DE pedagogy. The pedagogical design of DE programme and its influences on student experience which is shown in Table 5 will be further

discussed and pedagogical changes of three stages of DE delivery are recommended in Section 7.3.5.

3.5.5 Main learning strategies used in six groups of learning activities

Distance learners successfully developed their learning strategy when experiencing difficulties. However, there are some difficulties have been expressed by the students, but they did not find proper strategies to deal with these. For instance, no significant strategy was mentioned to deal with the problem of feedback. The frequently used strategies are selected from the findings and are categorised into six groups of learning activities (Figure 6).

Table 6. Learning strategies used in six group of learning activities

No	Study activities	Use of strategies
1	Reading materials	• Print out reading materials; • Skimming materials
2	Understanding learning content	• Reflection of experience • Relating to existing knowledge
3	Seeking support	• Interaction with relevant staff • Interaction with peers • Interaction with colleagues • Interaction with family members
4	Using technology	• Learning extra skills • Using existing knowledge of technologies
5	Dealing with feedback problems	• Need to be explored
6	Preparing for evaluations	• Planning • Start early

As shown in Table 6, learning strategies which were mostly mentioned by the participants in focus groups are categorized into six groups of learning activities based on how and why these strategies were used. In the first learning activity (i.e., reading materials), printing out learning materials and skimming the paper were selected as frequently used strategies. In addition, reflection of real life experience and relating to existing knowledge were selected in improving cognitive efficiency in the second learning activities. In third learning activity, interacting with peers, instructors, colleagues and family members were selected in seeking learning support. Moreover, learning extra skills and using their own IT knowledge to improve learning were selected in using technology. Also, planning the task and starting it

early were selected as the strategies used in preparing for the evaluations. However, in the fifth learning activity, there were no findings of regarding students deal with the problems of feedback. This needs to be explored in future research. Based on the findings illustrated in Table 7, the extent to which these strategies are used by distance learners in general were researched in the second stage (see Section 5.3).

3.6 Summary of this chapter and limitations of initial case study

The findings of this chapter provide details of the student learning experience, the problem of interaction and pedagogical issues in distance learning environment. The findings of pedagogical dilemma and the 'iceberg' of student independent learning experience in the existing knowledge suggests the inquiry of knowing how student learn independently. A lack of knowledge on this point caused confusion on what should be done in delivering DE, unawareness on students' experience of difficulties in learning and their solution on solving these problems. To develop the DE pedagogy, it is essential to learn from student experience. However, this initial case study was focused on the potential improvement of DE pedagogy rather than independent learning experience. The research of how student learn independently was not the main focus. A deeper and wider research is required.

However, most of the 'iceberg' is under the 'water'. The reason which caused pedagogical dilemma also causes the difficulty for further exploring student independent learning experience in current study. Based on the understanding of how student learn in a DE programme in university (initial case study), it is important to find the key to explore learning experience, which should be able to provide a solution for institutions to think about 'how to teach' and for distance learners to think about 'how to learn'. Therefore, findings of initial case study are further discussed referring to the theories of learning and educational psychology in the following chapter, which is based on a consideration of how learning effectiveness can be achieved in a complex learning environment. Outcomes of these discussions will provide an original instrument for the research of distance learning experience in general and it finally guide the research direction of second stage in current study. Relevant details are shown in Chapter Four.

Chapter Four - Development of a Distance Learning Experience Framework

4.1 Introduction to this chapter

Based on the findings of the foregoing case study, this chapter discusses the distance learning experience and identifies the key issues for distance learning success. In addition, based on the study of relevant theories of these identified key issues, a *Distance Learning Experience Framework* is designed as an instrument of exploration for next stage of the research.

The main points discussed in this chapter are:

- The key to distance learning success,
- Issues relevant to metacognition,
- Developing a framework of the distance learning experience
- Addressing the overall research objectives,
- Design of a distance learning experience questionnaire

4.2 Discussions on the key to distance learning success

4.2.1 Introduction to theoretical framework which employed in the discussions

The findings of the initial case study provide a better knowledge of how students learned in their programmes within ASBE and how their learning experiences were influenced by certain factors. The analysis in Chapter Three has indicated that students mainly learn independently rather than interactively, and that the keys to distance learning success needs to be further identified. According to Garrison *et al.* (2000) and Garrison and Arbaugh (2007*), social presence*, *cognitive presence* and *teaching presence* cover the main aspects of all educational experience; thus, these are designed into their model of Community of Inquiry (CoI). The following figure illustrates this.

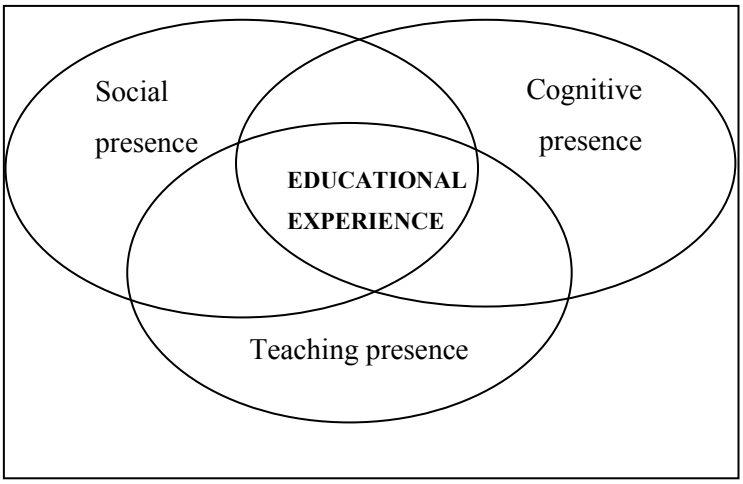


Figure 26. Model of the Community of Inquiry

Source: Garrison and Arbaugh, 2007, p.158

To analyse the key to distance learning success based on a systematic and comprehensive view of the distance learning experience, CoI is now applied as a framework for the following discussion.

4.2.2 Issues of social presence: the role of interaction

4.2.2.1 Social presence and interaction

Social presence is best explained as 'the ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of protecting their individual personalities' (Garrison, 2000).Social constructivism emphasises the social influence on learning; constructivist theories have previously contributed to the revolution in educational psychology. They hold that psychological dynamics interact with the surrounding environment and learning outcomes (Slavin, 2000; Mclnerney, 2010). Interactions which occur between the learner and other aspects of learning are social presence in distance learning experience.

4.2.2.2 Expanding forms of interaction and re-defining it as a learning strategy

Unlike their campus-based equivalents, distance learners do not learn in a closed environment, such as a classroom. Higher education at postgraduate level encourages reflective learning and critical thinking, which is related to working experience and the people who have professional knowledge. The interactions in distance learning include the factors in an external environment, for example, student-to-colleagues interactions, student-to-professionals interaction, student-to-friends interaction and student-to-family members' interaction. Existing theory on distance learning tends not to cover the learning environment of distance learners, which generally remains unconsidered by pedagogical designers. To promote

effective distance learning at postgraduate level in the Built Environment, the interactions existing in learners' external environments need to be properly embraced into the consideration of pedagogy. This thesis categorizes interactions into *internal* interactions (i.e. those inside the programme) and *external* interactions (i.e. those outside the programme) (see Figure 27).

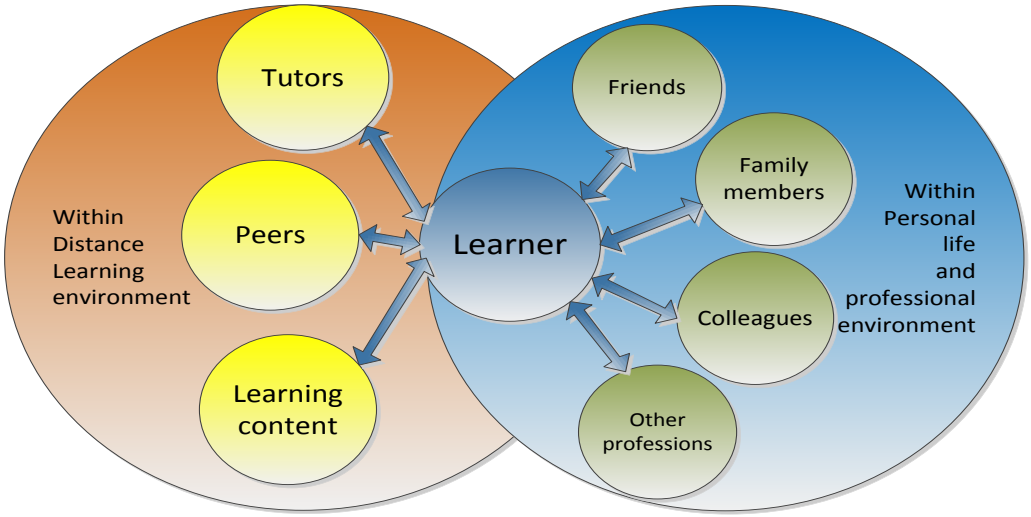


Figure 27. Internal and external interactions in student experience

Figure 27 shows that internal interactions in relation to the learners include the interactions between learners and tutors, peers, and learning content. External interactions in relation to the learners include learner to friends, learner to family members, learner to colleagues, and learner to other professions. These interactions expanded the forms of interactions from previous research.

Students decide and select the form of interaction for their specific purpose. Whilst students under taken interactions to seek support or solve problems, they are using interactions as learning strategies. Therefore, based on the findings of initial case study and discussions in this section, interaction in this thesis is re-defined as a learning strategy, which means that it includes human interactions both inside and outside of the DE programme. In other words, internal interactions and external interactions are both considered as learning strategies in this current research.

4.2.2.3 Problems in using the term 'interaction'

The role of interaction is characterised by epistemological assumptions about the role of human and interaction in education and learning (Thorpe, 2002). In this respect, the term 'interaction' is generally understood as human interaction, but in educational theory it means more. To professionals and researchers in the field, interaction has extensive context which includes all the main factors of learning. All behavioural, cognitive, and metacognitive

activities are included in the meaning of *interaction*. However, to DE operators and learners, the meaning of *interaction* is mostly identified with human interaction. This 'misunderstanding' causes cognitive and metacognitive functions of the theory of interaction to be neglected when the theory of interaction is applied as a principle in the design of DE. This thesis therefore suggests that the same meaning of terminology should be adopted in research and practice. Acceptance of academic words in the professional field is as important as the theory itself.

4.2.3 Issues of psychological presence: cognitive effectiveness

Findings from the Case Study (see Chapter 3) have demonstrated the influence of psychological dynamics on the independent leaning experience. Individual emotions were impacted by the difficulties of learning and students developed strategies to cope with these difficulties, to adjust their emotions and maintain motivation. Thus, according to Slavin (2000, p.255) 'one of the most important principles of educational psychology is that teachers cannot give students knowledge. Instead, students must construct knowledge in their own minds'. Again, the current research findings on the independent learning experience have shown how students' 'mind' was impacted by the learning environment. Previously, researchers have argued that practical pedagogy needs to pay more attention to such psychological aspects (see, for example, Shuell, 1996; Tomlinson, 2008). This section discusses psychological issues in the distance learning experience.

The very nature of DE and its tendency to make the learning experience more difficult, show that distance learners are isolated and at the same time can be disrupted by personal life and commitments. The findings reveal that these difficulties can affect the psychological dynamics of the student learning experience, resulting in, for example, emotional changes. For example, researchers have previously found that 'happy' subjects retrieve happy memories faster than 'sad' ones and 'sad' subjects retrieve 'sad' memories faster than 'happy' ones (Teasdale and Fogarty, 1979). Moore *et al*. (1984) explain this by arguing that a positive effect in particular may promote a 'cognitive loop' that increases the salience and availability of positively toned memories. A further consideration is that emotions are based on the internal body environment, which acts as input into the brain, just as visual or auditory information is an input to the brain from the external environment (Charlton, 2000).

Conversely, emotions affect experience, and motivation is an important psychological factor in distance students' success (Simpson, 2008); thus instructors need to support students in maintaining motivation for successful learning (Williams, 1995; Zimerman, 1995; Corno and Kanfer, 1993). Earlier behavioural research has focused on external/internal or extrinsic/intrinsic motivations as determinants of action (Lepper *et al.*, 1973). Based on these

two types of motivation, Greeno *et al.* (1997) added a third (engaged participation) type of motivation.

At postgraduate level, students need to be motivated to progress cognitive practice, and to be motivated to completing the course within their personal lives. Therefore, motivation needs to be maintained in three stages of DE. Firstly, the students need to deal with the difficulties produced by their personal lives, DE delivery, and the separation of learning from teaching, which is related to external motivation and engaged participation. Secondly, distance learners need to seek cognitive efficiency in their learning process, which is related to internal or intrinsic motivation, as suggested by Lajoie and Azevedo (2006). Therefore, both intrinsic and extrinsic motivation need to be maintained during the process of distance learning (see Figure 28).

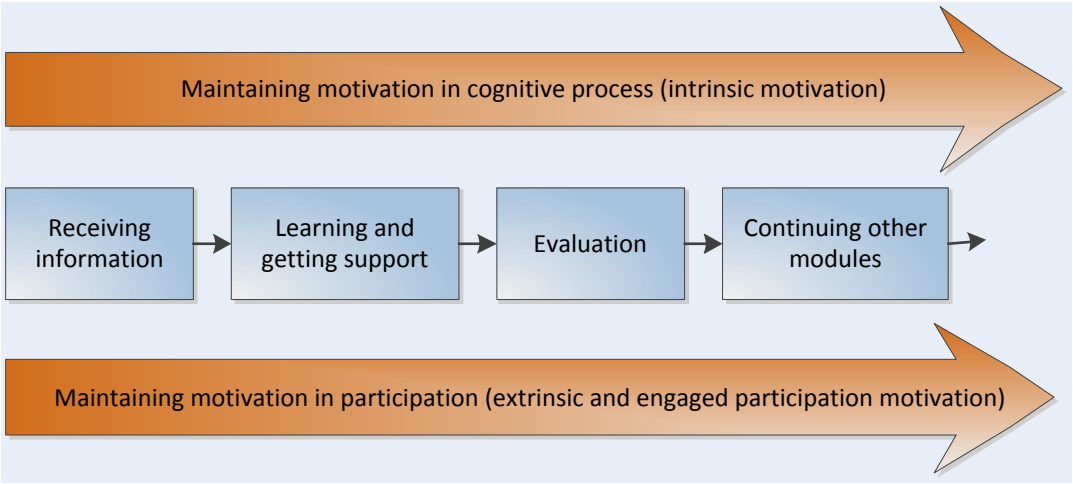


Figure 28. Maintaining motivation in distance learning experience

Figure 28 shows the needs of maintaining motivation in a long term which requires intrinsic, extrinsic and participation motivations. Students' intentions and their action on maintaining motivation therefore are critical to complete the learning process and obtain better performance. The findings of learning experience in the initial case study show how some students use strategies to maintaining motivation. However, this is not enough for understanding the conditions of students' motivation in the process of distance learning, and also does not show how strategies were used in each group of learning activities. How do students take actions in maintaining their motivation in a long term learning process? An understanding of the student learning experience in these relevant issues needs to be addressed at each stage of distance learning. This is considered in the design of primary research at the second stage (see Section 4.4.4).

4.2.4 Issues of teaching presence and the emergence of a new type of DE

In DE the teaching act is separated from learning act. The influence of teaching presence in learning experience is presented by organisational influences in three stages of DE delivery. Institutional presence in distance learning experience reflects on the role of teacher, use of technology and design of learning support. To achieve the aims of this project, an understanding of the particular features of DE at postgraduate level in the Built Environment is required.

By reviewing of the typology from previous literature, Keegan (1996) pointed out that the basic distinction of those institutions is 'between autonomous distance teaching institutions and distance subsections of conventional institutions'. Based on the findings of his research, Keegan produced a new typology of distance education systems. He divided distance teaching institutions into two basic groups: autonomous institutions and mixed institutions; and these two basic groups are divided into 5 subgroups based on their didactic structure.

The distance learning programme in ASBE is managed at the school level, and the School manages education in both on-campus programmes and distance learning programmes. This matches the description of Keegan's *mixed institution*. There are three kinds of distance education involved in the mixed institution, i.e., independent study divisions or extension colleges of universities; the consortium model and the Australian integrated mode or New England model (Keegan, 1996). These three models are explained as follows:

> Independent study divisions of a conventional college or university
>
> Examples of independent study divisions are numerous and have been in existence for almost a century. The Department of Independent Study or Correspondence Study is usually one of the divisions of the extension college. Departments of independent study offer courses in many delivery modes within the field of distance education.
>
> The consortium model
>
> Consortia are groupings of educational and other structures constituted for the organisation of distance educations. They bring together universities or university departments, government agencies, business partners, radio, television and media production authorities for the purpose of enrolling students in distance education courses.
>
> The Australian integrated mode- New England model
>
> A distinct form of distance education department within a conventional college or university has evolved in Australia. It is known as the 'new England Model' (New

England is an area in New South Wales, 300km NW of Sydney) or the Australian integrated model). In 1955, the university of New England commenced teaching both on-campus and externally. A unique staffing structure and an attempt to preserve as much of on-campus provision for students as possible was evolved for the distance system.

Keegan, 1996, p.131

Focusing on the type of DE represented in ASBE, it should be explained that ASBE collaborates with professional organisations and students who enrolled in its distance education programmes to obtain qualified credits which enable them to register their professional qualification with the relevant organisation. This is a feature of DE in the Built Environment (see Section 2.6.2). The existence of DE in a conventional university at school level is explained by the Australian integrated mode, however, its cooperative relationship (with professional bodies) is not covered within Keegan (1996)'s typology. Therefore, the distance learning programme in ASBE is an extension of Keegan's theory. It is identified in this thesis as: **the combination of university and professional organisation content model**. Thus a new type of DE is defined as a sixth group and added into Keegan's (1996, p.131) typology within the overall category of the mixed institution. See Figure 29, below.

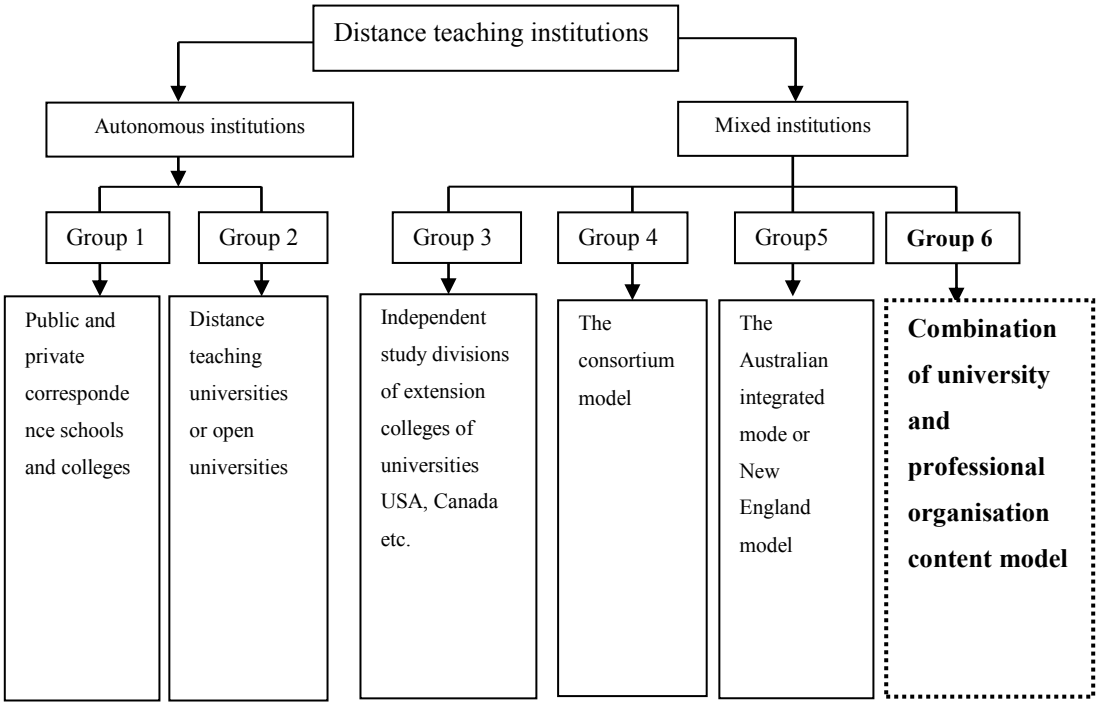


Figure 29. Sixth group of distance education developed from Keegan

Recognition of the specific feature of DE programme in the Built Environment (i.e., sixth form of DE as shown in Figure 29) is important for understanding the issues in DE delivery.

For instance, its strength of the cooperation with professional body can explain the reason for a lower level of dropout rates; and its limited capability on DE delivery can explain the reason for feedback problems. Holmberg has argued that autonomous universities have the disadvantage of expertise over mixed institutions, which are sometimes less professional (Holmberg, 1981). This thesis suggests that the students need to be aware of the features of the sixth types of DE and adjust their own learning perspectives and learning actions accordingly. As suggested by Boud (1995, p.14-15) 'effective learning also involves learners being able to influence their own learning rather than waiting for others to do so, that is, being proactive'. The question is, how can issues caused by the nature of sixth type of DE solved by the learners? This is considered in following discussions together with the issues of social presence and psychological presence.

4.2.5 Discussion on the key to distance learning success - metacognition

The discussions above show predict that distance learning students study with multi-influences in an isolated environment facing unpredictable difficulties and need to manage these multi-influences on their own. Distance learners need to take their own responsibility which is essential for autonomous learning (Oxford, 2003). Specifically, they need to be active in terms of both internal and external interactions to achieve deep and critical understanding; maintaining motivation across the long time learning process for cognitive efficiency; and to take action to seek more support in terms of the nature of the sixth form of DE. This can be achieved by students' metacognition and relevant actions.

Metacognition 'refers to one's knowledge concerning one's own cognitive processes or anything related to them' (Flavell, 1976, p.126). Murphy (2007) argues that distance learners do not necessarily take their self-responsibility in learning even though it is assumed that they can learn autonomously. In addition, even though metacognition has been a well-known factor in learning effectiveness (see Section 2.4.2), its key role in distance learning success has not been realised. An investigation into students' experience of metacognition is required for understanding the extent to which students are taking their own responsibility for learning and seeking solutions for improvement.

Researchers have previously contributed to the research on metacognition and recommended further investigation: for instance, to explore the extent to which students use cognitive and metacognitive strategies and how it impacts on learning outcomes (Anderson, 2007); to understand students' self-awareness, experience and their use of metacognitive strategies (Zahedi and Dorrimanesh, 2008); and to understand what knowledge students have about metacognition, what are they doing in terms of metacognitive skill and their experience of metacognitive learning (Hacker, 1998). In addition, the ways in which 'metacognitive regulation processes' and metacognitive knowledge are associated with the use of processing

strategies and students' motivation has also remained obscure. The cognitive, regulative, metacognitive, and motivational components of student learning have rarely been examined together in a single study (Vermunt and Vermetlen, 2004).

This section has discussed how to achieve learning success in a complex distance learning environment which contains multiple distractions and requires higher level of self-responsibility. Metacognition is the key to distance learning success. The lack of research on the overall issues in relation to metacognition is considered in order to deeply understand metacognition in student experience. A comprehensive study on relevant theories of learning and educational psychology is carried out step by step in order to build a framework for an overview of the relevancies.

4.3 Theoretical study of metacognition

This section critically analyses the factors which relate to the student metacognitive learning experience. The analysis of organisational influences on learning experience shows how learning is shaped and influenced by the way DE is delivered. Reactions occur between learning and teaching.

4.3.1 Five scales of learning in relation to metacognition

It is suggested that metacognitive awareness consists of three parts: thinking about what one knows (metacognitive knowledge), thinking about what one is currently doing (metacognitive skill) and thinking of what one's current cognitive or affective state is (metacognitive experience) (Vermunt, 1996). Methrotra *et al.* (2001, p.67) suggest successful distance learning students need to be 'goal oriented, highly motivated, with a joy of learning and willing to try new ways of learning'. Also, it is suggested that a successful student needs to 'be highly motivated and curious, know [their] strengths and preferred styles of learning, have an encouraging learning environment, be prepared to accept constructive feedback and reflect positively on it, and remain focused on goals and organise the learning environment to achieve them' (Payne and Whittaker, 2006, p.13). These theories point out the importance of motivation, self-awareness, environment influences, ability to accept criticism and learning strategies. These main elements of distance learning are further analysed based on the features of DE.

Firstly, as discussed in the last section, students need to be aware of the nature of distance learning environment and be aware of what they are required to do in distance learning. However, distance students' existing perspective on learning is mostly formed based on their pervious learning experience in school and/or universities. They need to develop awareness about the nature of DE, in which they face a new learning environment that challenges their

existing perspectives on learning. As Boud notes, 'students who develop the capability of monitoring their learning are metacognitive aware' (1995, p.14). Without the awareness of the features of distance learning, students would not be able to understand how they can properly learn in such an isolated environment. To develop DE pedagogy, it is important to understand 'what students know about their own learning, what they think "learning" is, and how they engage "learning" as a consequence' (Meyer, 1997, p.491). Therefore, the metacognitive awareness of students about the nature of DE needs to be investigated.

Secondly, as pointed out by Payne and Whittaker (2006, p.8) 'one of the most important skills to acquire is how to learn'. Simpson (2002) adds that to achieve successful distance learning, having relevant learning skills is important. In considering the separation of the learning and teaching act, learners' ability to learn is essential for taking autonomous learning. On the one hand, distance learners are expected to have the ability to learn autonomously (Murphy, 2007); on the other hand, it is argued that it cannot be generalised that all distance learners possess such skills (Dzakiria, 2004). However, to what extent students are capable on taking responsibility for their own distance learning is unknown to the instructors: there is a need for analysis of the students' self-evaluation of strengths and weaknesses in this respect.

Thirdly, motivation is an important psychological factor in students' success (American Psychological Association, 1997). In distance learning, the role of teacher changes from traditional educator to be 'supporter, facilitator, and guider'. Students have a responsibility for managing (controlling task), monitoring (cognitive responsibility) and motivating (maintaining efforts) their own learning (Garrison, 1993). At postgraduate level, students need to be motivated to progress their cognitive practice, and to be motivated towards completing the course within their personal life. Maintaining motivation is one of the purposes of learning strategy.

Fourthly, appropriate use of metacognitive learning strategy can contribute to the development of autonomy in distance learners and distance learners need metacognitive learning strategy more than conventional learners (Filcher and Miller, 2000; Anderson, 2007; Zahedi and Dorrimanesh, 2008). Effective learning requires knowledge of how to implement the appropriate strategies (Jones, 1985) and it can contribute to continued productivity in the lifelong learning environment (Weiburg and Ullmer, 1995). Thus it is vitally important to have an understanding of how students use strategies in their learning experience in distance learning. Anderson (2007) recommends that research in this area should consider the extent of students' use of cognitive and metacognitive strategies, their impact on learning outcomes, and how this can be fostered.

Finally, postgraduate learners need to self-evaluate their own strengths and weakness in a distance learning environment. 'Self-assessment is a reflective activity… … [that] focuses on students taking greater responsibility for their own learning' (Boud, 1995, p.34). Boud goes on to argue that self-assessment (synonymous to self-evaluation) is a necessary skill for lifelong learning. Distance students need to monitor and check their progress, improve learning practice and learn how to learn new skills, diagnose difficulties and support needs, all of which can be enhanced by self-evaluation (Boud, 1995). In addition, self-assessment has been found to help in overcoming isolation, promote active learning, control learning behaviours, provide diagnosis and remediation, and focus responsibility for learning on the students (Gale, 1984). In autonomous learning, lack of feedback can be a real feature of the very distance nature of the process (Lajoie and Azevedo, 2006). In DE, self-evaluation would therefore appear to impact especially strongly on students' further learning activities and their motivations. Students' self-evaluation of the effectiveness of learning strategies significantly influences on continues self-responsibility.

To summarise, effective distance learning requires the learners to: (i) be aware of the nature and requirement of distance learning and be aware of self-capability in completing the learning tasks (the level of awareness of distance learning can be valued by the students' self-report); (ii) strategically use learning skills to deal with the difficult experience (this can be explored from students self-report on experience of using learning strategy); (iii) maintain motivation on autonomous learning (the level of their motivation can be explored by students self-report at each group of learning activities); (iv) use strategies to deal with the difficulties and maintain motivation; (v) evaluate their own experience by comparing it with the result of institutional evaluation and finally impact on their level of satisfaction and further learning activities. In short, five scales of metacognition in distance learning are identified:

- Self-awareness, i.e. awareness of what should be done (knowing);
- Learning ability, i.e. self-strengths and weakness which can be evaluated based on the estimation of difficulties;
- Level of motivation;
- Doing, i.e. use of strategy; and
- Self-evaluation

4.3.2 A focus on use of learning strategy

Examination of the development of learning strategies shows that several issues are involved in *how and why* student use learning strategies.

As findings in Chapter Three reveal, students experience difficulties, psychological dynamics and need to achieve cognitive efficiency. This is achieved by their contribution on developing

and/or selecting strategies. By using the strategies, learners maintain their motivation and learn to deal with the difficulties. What and how strategies are used is dependent on how students understand the learning situations according to their own strengths and weaknesses. Therefore, students' action in using learning strategies is the reflection of metacognition and taking self-responsibility. An investigation focusing on these learning strategies will provide much required knowledge of how students learn in a comprehensive learning environment.

4.4 Designing a framework of the distance learning experience

Researchers have suggested that research into the learning experience need to consider the influences of multi-factors (Gibbs et al., 1984). To deal with this a toolkit is required for gathering the main learning activities which are essential for understanding the problems and potential solutions in the student learning experience. A developed instrument is needed, that can break down the invisibility and allow researchers and instructors understand the reality in order to develop pedagogy for better practice. This is attempted in the current section based on the study of theory of learning and educational psychology.

4.4.1 Relevant influences on the act of learning

Previous research has explored a number of factors which influence the distance learning experiences. Based on the findings of the initial case study and a review of existing literature, this thesis has defined the relevant factors which impact on learning act in DE.

4.4.1.1 Locus of control

Based on the research of how students learn (see above, Section 3.3 and 3.4), the development of pedagogy requires the understanding of *why* they learn in a particularly way and this requires a deeper analysis. *Locus of control* can have a strong impact on student learning activities while the external influences (for example, schedules, deadlines and so on) are absent. Thus, according to Slavin, 'It is important to note that locus of control can change and depends somewhat on the specific activity or situation (2000, p.334)'. The *locus of control* has been recognised as a main reason for student dropout and it is believed as relevant to learning performance (see, e.g., Jedege *et al*., 1999; Xenos *et al*., 2002). Two scales of locus of control were identified by Rotter (1954, 1966). Someone with an *external* locus of control is more likely to believe that external factors, such as luck, task difficulty, or other people's actions, cause success or failure. *Internal* locus of control is often called self-efficacy; it is the belief that one's own behaviour makes a difference (Bandura, 1997; Pajare, 1996; Schunk, 1991; Zimmerman, 1998). A person with an *internal* locus of control is one who believes that success or failure is due to his or her own efforts or abilities.

4.4.1.2 Attractiveness of the flexibility of DE

The separation of the teaching and learning acts provides a high level of flexibility in distance learning. For instance, the flexibility in choosing what and how they learn and freedom in determining tasks (White, 1995). The students have the advantage of flexibility in learning. The flexibility of distance education offers opportunities for students who are not able to attend on-campus education (Adams and Hopkins, 1994; Bourn and Bootle, 2005) and it is realised as a key to the design of DE (McNaught, 2005). To what extent students like the flexibility, and its impact on student experience is considered in this project.

4.4.1.3 Interests in professional qualification

As discussed in section 2.6, most distance learning programmes in the Built Environment provide credits for professional qualification. This is also found in the selected case study. How learning experience is impacted by student interests in the provided credits is one of the factors necessary to understand the student learning experience at postgraduate level in the Built Environment.

4.4.1.4 Satisfaction and commitment

ASBE has considered student satisfaction in developing DE programme of learning support informed by, and based upon student demands. However, as shown in Section 3.2, these demands are often unreliable and unstable. The importance of achieving students' needs is emphasised by student-central theory and improving students' satisfaction will help institutions in meeting students' needs in the context of increasing competition (Astin, 1993). Astin (1993) defined satisfaction as the student's perception pertaining to the educational experience and perceived value of the education received. In order to increase the quality of distance education programs, schools need to assist students in making the adjustment to learning at a distance by enhancing student satisfaction and commitment (Rovai, 2002). Satisfaction therefore is considered as a factor in influencing distance learning experience in this project.

4.4.1.5 Feedback problems and student perspectives

The problem of feedback, which has been discussed previously, appears in the case study. Lack of feedback has been mentioned by most participants while only a few of them had positive reactions to tutors' feedback and comments. What are the reasons for feedback problems? How do students deal with situations where feedback becomes a general problem in DE? This research study considers the influences of student expectations on learning and explores what feedback means to the students. Based on this, analysis of students' expectations on the learning experience can be carried out.

4.4.1.6 Reasons for attending DE

The findings show that majority participants set goals in their learning. The significance of goal setting was mostly discussed on its role of maintaining motivation. Learning goals are important for the individual learner 'to become an effective participant in an unfamiliar knowledge community' (Northedge, 2003). Students' learning experience is governed by their goals of learning (Kolb *et al.*, 1999). Barron and Harackiewicz (2001) argued that endorsing multiple goals simultaneously is crucial to successful learning at university level. However, Clarence (2008) believes that more goals are not necessarily better and he suggests the need for further research to explore how some students are able to use different goals and strategies in a strategic and flexible manner for their own benefit. Individuals have their own goals and chose DE for different reasons. There is a suggestion in the literature of a connection between the reasons students opt for DE, their goals, and their overall learning experience, and testing this is of interest to the present study.

4.4.1.7 Summary

In summary, the student learning experience is impacted by multiple factors, and without an overview of these factors it is difficult to understand the way they learn, and to have a view of how their learning can be improved. This research therefore, considers the influences of:

- Locus of control
- Attractiveness of the flexibility of DE
- Interest in professional qualification
- Satisfaction and commitment
- Feedback problems and student perspectives
- Reasons for attending DE

4.4.2 The criteria for evaluating positive learning experience

Learning outcomes, as reflected in the level of marks achieved, are a main basis for evaluating the learning experience. However, distance learners have various reasons and goals and there are also a number of difficulties that need to be overcome in maintaining learning act. These too, need to be considered when evaluating the overall learning experience. In considering the particular features of distance learning and the learners, this study considers multiple factors in the evaluation of the learning experience in DE. The effectiveness of learning strategy will be examined in terms of its effects on these factors.

Firstly, based on the reasons for attending DE, students have their own judgement on how well they have done, and this could differ from the mark they achieve. How students evaluate their own achievement and how these relate to their use of strategies becomes one way of understanding the distance learning experience.

Secondly, high levels of isolation can be experienced by students. According to Simpson 'It has been suggested that isolation is probably the most important factor in drop out; students who fail to establish support networks are more likely to withdraw' (2002, p.10). Therefore, within a selected scope, student experience of isolation is examined in the present study: furthermore, the relationship between such experiences of isolation and other learning experiences is examined.

Thirdly, a student's level of engagement is generally considered as one of the better predictors of learning (Carini *et al.*, 2006). The initial case study findings show that relevant members of staff make their judgement on students' engagement based on their participation in interactions. However, the findings of student learning experience show that these interactions are not necessarily the primary basis for learning. This thesis suggests that student engagement in distance learning is mostly invisible and various. To what extent students engage into distance learning need to be reported by the students themselves.

In short, this study examines the following factors that are said to be associated with an effective distance learning experience:

- Levels of marks
- Self-evaluation of performance
- Feelings of isolation
- Feelings of distraction
- Levels of engagement

4.4.3 Characteristics of the learner

Student diversity appears in the initial case study and the unseen aspects of the learning experience show the importance of understanding the characteristics of individuals to the development of DE pedagogy. It is previously suggested that gaining knowledge about learners can facilitate better performance of distance education (Collis and Moonen, 2001; Moore and Kearsley, 2005; Marland, 1997; Rowntree, 1992). Knowledge about learners can help institutions in: 'counselling prospective learners; preparing packaged learning materials; planning a support service; adjusting the programme to suit the needs of different individuals; and counselling learners about ways of building on what they have learned ' (Rowntree, 1992, p.39). Also, it is important for learners to be self-aware of the influences these factors have on learning in order to build their own learning strategies in distance education (Meyer, 1997).

Findings of initial case study show that individuals differ in the type of strategies they adopt; most students are only aware of a few strategies. Some experienced difficulties in learning strategies were solved by their peers. The findings indicate individual's ability in using

learning strategy varies. One individual may be struggling with the feeling of isolation while another might have developed multi-strategies in their learning. Therefore, individual differences are considered as one of the aspects of understanding student experience in the second stage of this research. According to previous research, gender differences have been found to have an impact on the student learning experience (Porter, 1986; Smith, 1990; von Prümmer, 1990, Sen and Samdup, 2009). Other factors such as age and ethnicity can make a difference, particularly using wed-based instruction (see Enoch and Soker, 2006). Personal characteristics which impact on learning experience also include cultural and educational background (Deimann and Bastiaen, 2010), learning ability and conception of learning (Rowntree, 1992); special needs, e.g. disability, language, ethnic and cultural characteristics; social influence (Rekkedal, 2009); and communications technology connectedness (Tait, 2000). Psychological factors, such as motivation and locus of control, considered earlier, and also contribute to the individualism approach.

This study has selected a specific educational field for investigation, i.e., Built Environment. In considering the internationalisation of DE and adult learning at postgraduate level, language influence, family responsibility, the link between cultural influence and educational background, and previous experience in DE are also involved in addition to individuals' characteristics. In short, the multiple factors that are considered in the next stage of research include:

- Age
- Gender
- Domestic responsibility
- Use of English as first language
- Source of previous highest qualification
- Experience in DE

4.4.4 Designing a framework of distance learning experience

To summarise the issues discussed in this section, five learning scales of metacognitive learning activities are defined to describe how learning occurs independently. In addition, relevant factors in learning effectiveness and students' characteristics are selected to evaluate the influences of multi-factors. The five scales of learning and influences of multi-factors can be investigated in six groups of main learning activities (see Section 3.5.3) for obtaining knowledge of how distance learners learn. In short, in the next stage of the research three dimensions of distance learning experience are considered:

- Structure of learning shaped by the DE delivery (six groups of learning activities)
- Necessary issues for effective learning, and

- Individual characteristics combine with psychological factors.

A novel framework of the distance learning experience has therefore been designed based on the above mentioned three dimensions (see Table 7).

Table 7. A framework of the distance learning experience

	Awareness	Difficulties	Motivation	Learning strategy	Effectiveness	
Reading materials						Relevant factors: marks, engagement, locus of control, perspectives and satisfaction, knowledge development
Understanding learning content						
Seeking learning support						
Using technology						
Dealing with feedback problems						
Preparing for evaluations						
Background information	Age, gender, origin of student, language status, domestic responsibility, experience in DE, cultural influences,					

Within this framework (Table 7), there are six groups of learning activities (separated into each cell in the left hand column) and five components of learning processes (on the top row). In the middle of the matrix, each blank cell represents an intersection of an *activity* and a *component* and indicates an area which can be investigated (for instance, the association between the students' *level of motivation* and their *dealing feedback problems* represents an area for potential investigation. Thus the distance learning experience can be analysed according to this framework.

4.5 Updated research objectives

As described earlier (in Chapter 1, Section 1.3 – Research Methodology) this study has employed mixed methods to achieve the research aim (i.e., 'To critically appraisal student experience of using strategy for improving pedagogical design', see Section 1.2.1*)*. In the initial part of the study, a constructivist approach was used to 'make sense' of the area of interest through the use of a case study. The result was the framework of the *distance learning experience* introduced above in Table 7. From this point in the study, a more positivist approach will be adopted in Stage 2 of the research project, involving two parts. Part one involves the testing of the hypothesis that *metacognition is the key to distance learning success* by using the *Framework of the distance learning experience* introduced above in

Table 7. This process is described in Chapter Five. The second part of Stage Two of the research project involves its use in proposing improvements to the pedagogical design of distance learning. This is done in Chapter Six of the thesis. The research objectives in second stage have been developed to:

- test the role of using strategies to distance learning success
- evaluate the potential improvements of metacognitive capability

4.6 Designing an instrument for further research

4.6.1 Selection of survey questionnaire in data collection

To achieve the updated research objectives, both qualitative and quantitative data is required. Firstly, qualitative data of the details of user strategies is required to understand how these strategies are used to deal with difficulties. Secondly, quantitative data is required to evaluate the extent to which students used learning strategies, and the effectiveness of these strategies, level of demands for improvement, potential improvement and influences of multi factors. The collection of those required data is operated through the use of survey research. Surveys can collect qualitative data whilst still being regarded as primarily quantitative and positivistic (de Vaus, 2002). Saunders *et al.* (2007) explain that survey methods are generally used to collect the descriptive detail of identified variables and to analysis their relationships (2007). In this study, the function of the survey is the collection of quantitative data (based on a positivist approach to the developed framework) and also is used to collect detailed qualitative data based on the further extent of the research objectives.

4.6.2 Questionnaire design

The questionnaire is designed based on the *framework of distance learning experience*. It contains both closed and open-ended questions.

4.6.2.1 Use of closed questions/statements

The design of closed questions/statements was based on the three dimensions of the framework, supplemented by the further analysis of the components, as exemplified by Table 7 (Learning strategies used in six groups of learning activities) on page 75, above. Firstly, for each cell from within the table (see Section 4.4.4) a statement was designed. Thus, overall experiences of distance learning are covered in the questionnaire. Options provided for answering the statements were accommodated into a five-point Likert scale (i.e., strongly disagree, disagree, neutral, agree, and strongly agree) of which only one point was to be selected by respondents. Secondly, an understanding of the differences between individuals is essential for design of DE delivery. The closed questions/statements were designed to reflect

each factor of learners' features. Answers to these questionnaires allow the test of how these factors impact on students' experience of using strategy and metacognitive capability.

4.6.2.2 Use of open-ended questions/statements

Open-ended questions/statements were designed to collect qualitative data from three aspects. Firstly, to understand the role of learning strategies to deal with difficulties, details of what and how learning strategies need to be explored. Secondly, to avoid missing out on any experience in the *Framework of Distance Learning Experience*, open ended comments were invited particularly for testing the validity of the framework. Thirdly, findings of initial case study have presented the fact that *feedback problems* and *lack of learning strategies* are issues. What the feedback mean to students is therefore important to develop thought on this problem. Also, the design of support in DE is provided to individuals; knowing the reasons for selecting DE and its influences on using strategies are considered. Therefore, open ended questions were designed to explore what tutors' feedback meant to the students and reasons for students selecting DE.

4.6.2.3 The structure of the questionnaire survey

The Distance Learning Experience Questionnaire includes a total of 78 items structured into three parts. Part One includes 19 items and the questions are about students' personal traits such as identity, background and self-condition to learning. The items in Part One were designed based on the analysis of theories of differences between individual learners. Part Two includes 58 items and the questions are related to students' distance learning experience. The existing knowledge of characteristics of distance learning and emerging learning activities discovered from qualitative research are included. The third part includes only one question which is kept open for any relevant comments.

4.6.3 Ethical issues to be considered in questionnaire design

Several items about learning experiences were adapted from the outcomes of the 'ETL project', which is the 'Learning and Studying Questionnaire' (http://www.etl.tla.ed.ac.uk/questionnaires/LSQ.pdf). The ETL project 'sought to develop subject-specific conceptual frameworks to guide institutional and faculty or departmental development of teaching-learning environments' (http://www.etl.tla.ed.ac.uk/project.html). The items which were modified from the original items in LSQ include 'when learning, I was easily distracted', 'concentration is not usually a problem for me, unless I'm really tired', and 'I organise my study time carefully to make the best use of it'.

4.6 Summary of issues that emerged from this chapter

The issues involved in this chapter are now summarised. Firstly, through the discussion of *social presence*, *cognitive presence* and *teaching presence* within the distance learning experience, the features of distance learning experience include the involvement of external interactions, maintenance of intrinsic and extrinsic motivation, and seeking support in sixth type of DE. Taking responsibility on these actions based on the awareness of DE is essential for students to learn in sixth type of DE. As a result, metacognition is defined as the key to distance learning success. Secondly, the relevant factors of metacognition are studied from the existing literature and a new framework of distance learning experience is developed. Thirdly, a focus on learning strategy is identified to investigate the student metacognitive learning experience. Thus, the research objectives were updated. Finally, a questionnaire was designed for the application of survey research based on the inquiry of updated objectives from the framework, which provides a tool of data collection for the research in second stage of the study. The details of data collection and findings of questionnaire research are included in Chapter Five and Chapter Six.

Chapter Five - Findings and Analysis of the Questionnaire (Part One - Testing the role of learning strategy)

5.1 Introduction to this chapter

5.1.1 Enquiry of data analysis

The use of learning strategy has been defined as the key to learning effectiveness in the initial case study. The initial case study attempted to understand the pedagogical issues and student learning experiences in DE at postgraduate level in the Built Environment. One finding of the case study was that there was a lack of validity to pedagogical improvement in the whole focused field. The emerged approach was further tested in survey research.

This chapter tests the key to learning strategy based on the analysis of qualitative and quantitative data. Firstly, a test is carried out of the extent to which students use learning strategies. Secondly, the ability to deal with difficulties experienced by the learners are considered. Finally, the chapter evaluates of learning strategies in facilitating positive learning experiences. The research objectives of this chapter are to:

- evaluate the extent to which students used learning strategies
- evaluate the role of learning strategies to deal with difficulties
- evaluate the effectiveness of learning strategy to positive learning experience

5.1.2 Main points of this chapter

This chapter contains part of data collection, findings and analysis of questionnaire. The relevant findings are analysed following the enquiries of data analysis. A test of the framework of distance learning experience is contained in Section 5.2. The extents to which student use learning strategies are analysed in Section 5.3; the role of strategies to learning effectiveness is analysed in Section 5.4; and the effectiveness of learning strategies is analysed in Section 5.5. Finally, the role of learning strategy on effective distance learning is approved by the findings.

5.1.3 Data collection in the survey questionnaire

5.1.3.1 Pilot study of questionnaire design

The aim of the pilot study was to ensure the clarity of the questions and to avoid misunderstanding among the participants. Three waves of pilot study were carried out. The

first wave involved six PhD students over a period of two weeks. Questions were piloted based on the level of difficulty, general issues of the form of questions and highlighting any ethical issues. In the second wave, ten distance learning students were invited to participate. Their comments contributed to the detail of the questions, making the questionnaire easier to be understood. Again, this wave was completed in two weeks. In the third wave, 11 experts were invited to pilot the questionnaire by email (Appendix 6). These experts include researchers in the field of open and distance learning, learning support, educational psychology and technology enhanced learning. Comments from these experts were addressed on the issue of design and structure of questions, coverage of main issues, the audience's understanding and length of the questionnaire. The review took a month, providing valuable feedback and comments on improving the design of questionnaire. The list of experts is included in Appendix 7.

5.1.3.2 Online survey

Based on the nature of DE, learners are located in various locations. It is difficult to access and obtain information in person. These students are studying within the programme which adopts blended learning approach and is delivered online. An online survey was designed which was accessed by the students during the introduction to their enrolled programme. An online survey website was used in generating the online questionnaire (www.surveygizmo.com).

To ensure that the survey was only accessible to the targeted students, an invitation to participate in the questionnaire was sent directly to the students via internal email. In addition, two questions were designed to filter the students who are at postgraduate level in the Built Environment (i.e., within which subject area are you studying? and what level is the programme you are studying?). Responses which do not belong to the defined category are not included in the analysis. Data collection started on December 2010 and closed on 28 July 2011. The survey was completed as according to the planned time schedule. The participants withdraw in the process are reduced. There are a total of 252 responses, only 151 of which were valid.

5.1.3.3 Sampling

Participants for the survey research were selected from current students who are studying in Built Environment distance learning programmes at postgraduate level. Institutions which run distance learning programmes in the educational field of Built Environment were contacted by email (Appendix 8). Out of the selected participating institutions, five responded but only two universities eventually took part in this research study. A brief outline of this survey (Appendix 9) was sent to their students at postgraduate level with the web link of the

questionnaire. Free sampling was used in data collection, i.e., the questionnaire was sent to all students to provide them the opportunity to participate in this survey.

5.1.3.4 Ethical issues

The purpose of this research is explained at the beginning of this survey. Students can only confirm their participation after understanding the purpose of this research. The consideration of the ethical issues was designed in the 'Welcome' section of the questionnaire (see Appendix11). In addition, the data were kept with a high level of confidentiality. A password was set to access the online data and all participants' information is hence kept anonymous. The obtained data were only used for the purpose of this research study.

5.2 Evaluating the framework of distance learning experience

To test the effectiveness of the distance learning experience framework, open comments were collected through the last question: 'The last question gives you the opportunity to highlight any specific distance learning strategies which have not been included in the previous questions. Please state how effective they are in supporting your learning'.

The findings show that the designed questionnaire covered most of what learners experienced in DE. Out of 63 students who answered the question, five indicated that the questionnaire covered their experience by commenting, 'Do not have any particular input in this regard', 'Nothing further to add', 'In my view most of the questions covered the subject', and 'None not already mentioned'. However, the rest of the students made comments about their recommendations for effective learning, improvement of DE and their overall experience. All of these comments are related to the factors within the distance learning framework.

However, the framework of distance learning experience cannot define the difference between modules unless it is applied to different modules in a comparative study. This is pointed out by the participants. For example, one student comments:

> 'It is hard to summarise, as each module is different. Some tutors provide a lot of online guidance and advice, others very little. The latter can leave students confused as to whether they understand or interpret subject matter correctly. As each module / tutor is different, it has been difficult to answer some of your questions, so neutral responses were entered'

The findings explored from the open-ended comments show that all details of distance learning experiences are covered in the designed framework and questionnaire. There are no major learning activities outside the six groups of learning activities.

Previously, Talbot (2007) states that in all effective learning, students learn by: doing; assessment; reading feedback; learner autonomy; and reflection. In comparison to Talbot's categories, the six groups of learning activities further defined 'doing' as reading, understanding, seeking support and using technology. Feedback and assessment issues are also covered. In addition, defined learning autonomy and reflection are considered in another dimension with five expanded components of learning activity. Furthermore, a third dimension, which considers the features of learners, forms a holistic view of distance learning experience. Therefore, the designed framework has its originality and is valid to gain an in-depth understanding of distance learning experience.

Both findings in primary research and comparison with existing knowledge show that the new framework of the distance learning environment developed in this thesis is able to provide an picture of distance learning experience.

5.3 The use of learning strategies in student experience

5.3.1 Data collection and data analysis

5.3.1.1 Quantitative data collected from closed questions

The learning strategies which were explored in the Literature Review (see Section 2.4.2) and primary research (see Section 3.5.5) were employed in the survey research to test the level at which students use strategies. This is evaluated based on student self-reports on a five-point Likert scale.

5.3.1.2 Data collection and cluster analysis of learning strategy

Participants developed various strategies in each main learning activity. The findings of learning strategies are categorised. The variety of the strategies and the number of respondents who used similar strategies provide the evidence of individual engagement on using learning strategies.

Items used in data collection

Participants reported the strategies they used in dealing with difficulties and improving learning efficiency in each group of learning activity. The relevant items used in the questionnaire (Appendix 10) to expand what strategies are used by students include:

38) The strategies which I used for effective reading also include…
46) The strategies which I used to understand learning content also include …
55) The strategies which I used to seek more support for my learning also include …
63) The strategies which I used to improve the use of technology also include …

70) The strategies which I used for effective learning when I could not obtain feedback were …

77) The strategies which I used for preparing assessments also include …

The findings of open-ended questions show that a small number of students stated that they do not use any strategies in their learning. Most participants expressed the strategies which are developed in their learning experience. This section interprets their answers to what strategies they used for each learning activity.

Cluster analysis

In analysing the answers of the open-ended questions in social survey, all answers were collected together for exploring a big picture. The gathered data was clustered into different categories. For example, the original data of what strategies are used in students' learning experience was analysed within three phases. This is shown in Figure 30.

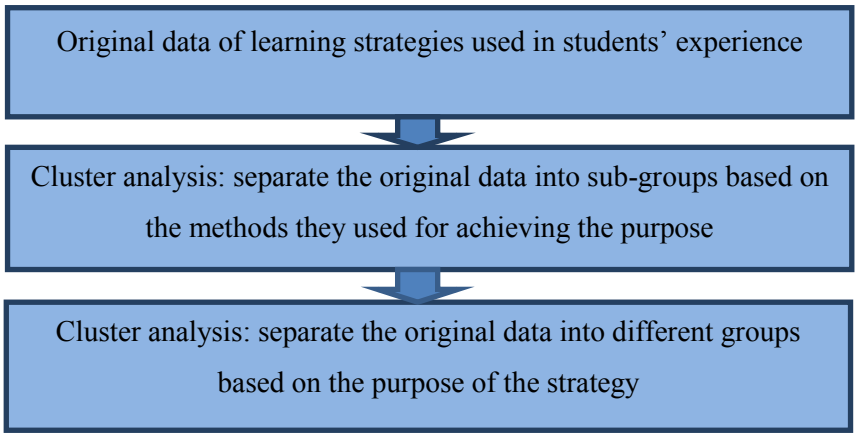


Figure 30. Qualitative analysis of student learning strategies

Figure 30 illustrates the process of cluster analysis of findings regarding the strategies used in students' experience. At phase one, the original data is categorised into different groups based on the purpose of the strategy. All of the original data was separated into six groups based on these purpose of using learning strategies. At second phase, the data categorised in each group was separated into sub-groups based on the similarity of the strategies. The data clustered in different groups were further analysed. Its discourses were analysed qualitatively and its frequencies were analysed quantitatively.

Coding multi- answers

The answers of open-ended questions are coded based on cluster analysis. Each strategy was coded into a defined value as shown in the code book (Appendix 11). It was challenging to

identify the answers which involve multi- answers. In this case, a multiple response method is suggested to deal with the problem of analysing multiple-response data by De Vaus (2002), 'When coding any variables a case must belong to one and only one category of the variable' (De Vaus, 2002, p.10). The multiple response method was used as an appropriate method of coding multiple answers in the open questions. The answers to what strategies were used are coded into 3-4 variables, for example, 1st strategy, 2nd strategy and 3rd strategy. Each variable has the same categories as those which were identified based on cluster analysis. The categories of answer identified in qualitative analysis were used in the coding process. The multi-response in a single case is coded in several phases. Each response to an open-ended question is analysed in different steps at one single time to reduce possible mistakes in the coding process. The responses were then analysed on a case-by-case basis.

In addition, within different responses, it was possible to code the same category into different variables. Therefore, the total frequency of each strategy is calculated as a sum of its frequency in three variables.

Coding different types of responses

To have an overview of the responses, answers are categorised based on how many strategies they reported. The responses to using strategies are categorized and coded as:

- 1=No strategy
- 2=Single strategy
- 3=Multi-strategies
- 4=Not applicable

Inclusion of all responses in analysis

Within the data, the same strategies are described differently by different individuals. Also, some strategies are only mentioned by one student. Referring to the idea of individualisation, distance learning is carried out in a private learning environment and the design of DE needs to consider individual experience. It is important to consider all strategies which are mentioned by the participants regardless of their frequency of usage.

5.3.2 Overview of the findings: use of strategy is experience by all participants

In order to have an overview of the use of strategy in all participants' experience, a total value of the use of all illustrated strategies is calculated. Because the value coded for Disagree is 2; and Strongly disagree is 1 (see Appendix 11), a total value of 15 strategies which is higher than 30 represents that the student used of at least one strategy. Most of the results in Table 13 are higher than 30; this means that use of learning strategies was experienced by those

participants. A further observation of the data of the responder who has a minimum value of 28 finds that this student selected Disagree and Strongly disagree on 14 strategies, but a selection of Agree was made to 'Planning' in preparing for evaluations. In summary, 100% of the participants used strategy/strategies in the process of their learning. Thus, the findings prove that using learning strategies is a necessary activity for distance learners. Table 8 shows the total value of students' experience of using illustrated strategies.

Table 8. Total value of using illustrated learning strategies

Results		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	28	1	.7%	.7%	.7%
	36	1	.7%	.7%	1.3%
	37	1	.7%	.7%	2.0%
	40	3	2.0%	2.0%	4.0%
	41	2	1.3%	1.3%	5.3%
	42	2	1.3%	1.3%	6.6%
	44	4	2.6%	2.6%	9.3%
	45	3	2.0%	2.0%	11.3%
	46	5	3.3%	3.3%	14.6%
	47	4	2.6%	2.6%	17.2%
	48	8	5.3%	5.3%	22.5%
	49	2	1.3%	1.3%	23.8%
	50	3	2.0%	2.0%	25.8%
	51	7	4.6%	4.6%	30.5%
	52	9	6.0%	6.0%	36.4%
	53	16	10.6%	10.6%	47.0%
	54	16	10.6%	10.6%	57.6%
	55	10	6.6%	6.6%	64.2%
	56	10	6.6%	6.6%	70.9%
	57	10	6.6%	6.6%	77.5%
	58	8	5.3%	5.3%	82.8%
	59	6	4.0%	4.0%	86.8%
	60	5	3.3%	3.3%	90.1%
	61	4	2.6%	2.6%	92.7%
	62	3	2.0%	2.0%	94.7%
	63	2	1.3%	1.3%	96.0%
	64	3	2.0%	2.0%	98.0%
	66	1	.7%	.7%	98.7%
	67	1	.7%	.7%	99.3%
	68	1	.7%	.7%	100.0%
	Total	151	100.0%	100.0%	

5.3.3 Use of illustrated strategies

To analyse the data, the participants who selected 'Neutral' in each strategy indicate that these strategies have been experienced by these students, but the intention is not as strong in

comparison to the students who selected Strongly Agree and Agree. The total percentage of Strongly Agree, Agree and Neutral is calculated to show how many students used the illustrated learning strategies.

Goal setting, goal checking, environment management and time management are generally used in DE. Findings show that the majority of participants used environment management (78.8%), time management (64.2%), goal setting (75.5%) and goal checking (65.5). Relevant findings are shown in Table 9.

Table 9. Findings related to what extent general strategies were used by participants

Strategies	Relevant Items	Strongly agree	Agree	Total
Environment management	'I sought an appropriate environment for effective learning.'	17.9%	58.9%	**78.8%**
Time management	'I organised my study time carefully to make the best use of it'.	20.5%	43.7%	**64.2%**
Goal setting	'I set clear goals in distance learning'	17.9%	55.6%	**75.5%**
Goal checking	I checked my progress in achieving learning goals'	9.9%	55.6%	**65.5%**

In addition, to evaluate to what extent explored strategies are used, strategies selected from the findings of focus group research were designed into the questionnaire. Student self-reports on five-point Likert scale with regard to these learning strategies are analysed. The result of the total percentages of Strongly agree and Agree reveal that most strategies appeared in the majority of students' experience apart from printing out materials and skimming through the paper. In addition, the statistics show that the most frequently adopted strategies are relating to relevant experience for understanding the learning content (94.7%) and relating to existing knowledge (92.1%) in participants' experience. The results of the calculation are shown in Table 10.

Table 10. Total percentage of students who used learning strategies

Main learning activities	Strategies used	Strongly agree	Agree	Total value of Strongly agree, Agree and Neutral
Reading materials	Printing out learning materials	6.0%	7.9%	13.9%
	Skimming learning materials	10.6%	41.7%	52.3%

Understanding learning content	Relating to existing knowledge	31.8%	60.3%	**92.1%**
	Reflection of relevant experience	39.7%	55.0%	**94.7%**
Seeking support	Interaction with peers	10.6%	46.4%	57.0%
	Seeking support from colleagues	15.2%	46.4%	61.6%
	Interaction with family members	13.9%	41.1%	55.0%
Using technology	Learning extra skills	13.9%	42.4%	56.3%
	Embracing additional technologies	17.2%	43.0%	60.2%
Dealing with feedback problems	No strategies were suggested			
Preparing for evaluation	Planning	18.5%	62.3%	81.3%
	Starting early	19.9%	37.1%	57.0%

5.3.4 Findings of the types and frequencies of self-reported learning strategies

5.3.4.1 Strategies used in reading the materials

To respond on what strategies were used in reading the materials, 47participants adopted single strategy and 57 adopted multi-strategies. In total, 104 participants answered this question (Table 11).

Table 11. Responses on the strategies used for effective reading

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No strategy	4	2.6%	2.6%	2.6%
	Single strategy used	47	31.1%	31.1%	33.8%
	Multi-strategies used	57	37.7%	37.7%	71.5%
	Missing data	43	28.5%	28.5%	100.0%
	Total	151	100.0%	100.0%	

All responses are categorised into 20 groups and a strategy of learning is named based on the discourses in each group of learning strategies. Some strategies are used with high frequency and details. For instance, ‘note taking’ is most frequently adopted and is identified and29

participants highlighted that note taking was used as a strategy when they read the learning materials. 'Reviewing' were mentioned by 15 participants and 'focusing on main points' were mentioned by 14 participants. There are also a number of strategies were applied differently by few students such as high lighting, wide reading, findings and following guidance, using technologies, selection of reading, assignment focus, control reading speed, planning, full engagement, summarising and relating to previous reading materials. In addition, some strategies were mentioned by participants once and lack of details, for example, 'break the task down', 'starting from most important points', 'mind mapping', 'discussion with others', and 'use of verbal learning'. The details of these strategies are described in Table 12, below.

Table 12. Learning strategies used in reading learning materials

No	Strategies	Examples (from students' responses)	Frequency
1	Note taking	Writing in margins to ensure retention and comprehension; I tend to create my own notes to go over and summarise what I've learnt.	29
2	Reviewing	Reading same thing more than once; I read each of the course notes front to back and then went back when completing assignments I only used published books to find additional information.	15
3	Main point focus	Targeting what I needed to learn and reading appropriate texts accordingly; Focusing on most relevant parts but at least skimming it all.	14
4	Organising reading material	Organise reading material into relevant sections and make notes of salient points for future reference; Organising all learning materials provided online in a file and marking off when full reading has been satisfactorily achieved	14
5	High lighting	Highlight the important point while reading and make a note. Giving marks on important sentences, wherever I am always trying to read a book.	13
6	Wide reading	Course materials provided by the university were read at home, internet searches and the resources found there and through books are carried out on the train and main elements noted down or highlighted as necessary'	11
7	Find and following guidance	The guidance from the university on specific readings for different topics was really important.	10

8	Using technology	Use technologies for effective reading; having a program that reads it out loud as I am reading it on the screen; Using a Dictaphone to read out the text and play it back to myself	7
9	Selection of reading	In correct selection subject; Selection of the most important available reading on the topic, going through abstracts and overviews	5
10	Assignment focus	Read bits and pieces that would apply to the assignments only; Relating to the assignment questions in order to focus my reading	5
11	Control reading speed	Always been a fast reader	4
12	Planning	planning the week well, I make sure read something and etc; Planning and organising my workload	4
13	Full engagement	I read each of the course notes front to back and then went back when completing assignments I only used published books to find additional information	3
14	Summarizing	Reading a passage and then writing brief bullet notes to concrete my understanding	3
15	Relating to previous reading materials	Material from past courses that were relevant to the subject matter	3
16	Breaking down the tasks	Break down the tasks	1
17	Starting from the most important	I would start by reading what i had to ...	1
18	Mind mapping	Mind mapping	1
19	Discussion with others	Reading and discussing with colleagues on Skype	1
20	Verbal learning	Using a Dictaphone to read out the text and play it back to myself. This assisted in learning for exams and is helpful for the way in which I like to learn and learn most effectively i.e. verbal learning	1

5.3.4.2 Findings of strategies used for better understanding

83 participants provided their learning strategies to answer what strategies they used in understanding learning content (Table 13). Out of which, 43 provide single strategy and 40 provide multi-strategies.

Table 13. Responses on the strategies used to understand learning content

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No strategy	2	1.3%	1.3%	1.3%
	Single strategy	43	28.5%	28.5%	29.8%
	Multi-strategies	40	26.5%	26.5%	56.3%
	Missing data	66	43.7%	43.7%	100.0%
	Total	151	100.0%	100.0%	

The findings include various strategies which were developed in students experiences. The data show that 23 students do 'extensive research' and 'extra reading' for understanding of the learning content. The 'extra reading' explained by different students include: work related documents, internet and articles, history of the subject, library books, examples/case studies, journal articles abstracts and internet resources. In addition, interaction appears as a frequently used strategy. 16 responses used interactions which include internal interactions with peers and tutors; external interactions include discussing and learning from colleagues and friends with relevant knowledge, discussions with someone knowledgeable in the subject, and discussions and learning from family members. Apart from those frequently used strategies, a number of strategies are found with a small frequency such as asking help from tutor, giving time to understand, managing self-condition, and self-evaluation. The strategies which were used for understanding learning content are summarised and presented with its frequencies in Table 14.

Table 14. Findings of strategies used in understanding learning content

No	Strategies	Examples	Frequency
1	Wide reading and Background study	Extensive research; Additional research on the subjects in question, to help from a stronger understanding of it Reviewing available published literature to gain an insight where required.	23
2	Discussion with others	Discussions with others ; I review my understanding with people who I know understand it clearly	16
3	Reviewing important points	Read and re-read, asking questions online of my peers and researching further on the internet if I am unclear of something to see how other materials interpret the facts; Particularly when preparing for exams i would read through the materials and make notes on cue cards of	9

		specific topics and once complete, study only from the cue cards up until examinations	
4	Making notes and Summarise	Making my own notes and putting it into a context that I would understand	8
5	Using directions provided by the programme	I used only the learning directions provided by the university; Organisation is the key I think and giving yourself enough time set aside to learn properly	6
6	Focusing on the requirement/assessments/problems	Focusing on the problems highlighting and making notes; Focusing on assignment	4
7	Rehearsal and Memorise	Reading on time and reading again; Read and re-read, asking questions online of my peers and researching further on the internet if I am unclear of something to see how other materials interpret the facts	4
8	Using text book	Using text book	3
9	Seeking weak areas	Talking through the subject as though i was explaining it to someone else. This highlights any weak areas which you can then go back to.	3
10	Brain mapping and Imagination	Drawing diagrams in my own style helped with ensuring that the content was understood in my way of learning	3
11	Using provided technologies	The Blogs and discussion boards	3
12	Asking help from tutor	Email or call in to see tutor with query.	3
13	Giving time for understanding	Time to understand	2
14	Managing personal condition of learning	Taking short breaks; try remaining fully focussed for some time.	1
15	Verbal learning	Verbal dictation of material to assist my preferred learning technique	1
16	Using dictionary	Using dictionary for dealing with language problems	1
17	Self-evaluation	Check if the understanding is right	1
18	Approaching professionals	Discussion with colleagues and acquaintances, approaching professionals in certain fields of expertise.	1

5.3.4.3 Findings of strategies used in seeking learning support

There are 59 students responded to what strategies they used to seeking learning support. 44 participants provided a single strategy and 15 participants provided multi-strategies (Table 15).

Table 15. Responses on the strategies used to seek more support

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No strategy	7	4.6%	4.6%	4.6%
	Single strategy	44	29.1%	29.1%	33.8%
	Multi-strategy	15	9.9%	9.9%	43.7%
	Missing data	85	56.3%	56.3%	100.0%
	Total	151	100.0%	100.0%	

The answers to this question show that students sought support from both internal and internal resources. Using provided support system was most frequently mentioned and 13 participants stated that they used the provided support in their study. Seven participants mentioned that they seek support from tutors. Other strategies include seeking more recourse, managing self-condition, and talking openly. The categories and the frequencies of these strategies are shown in Table 16.

Table 16. Findings of strategies used for seeking learning support

No	Strategies	Examples	Frequency
1	Using provided support system (email, online discussion. Etc)	Send a post to the online forum requesting support on a problem; Using the VLE to read discussion threads and also establishing contacts within a locally based (London) study group; 1. Post question on discussion forum 2. Suggest and discuss on discussion forum 3. Name tutor to response but at advance time 4. to start the above as early as possible to activate discussion (in the understanding that more discussion and suggestion will help to understand a subject from different views) Contact with the programme Director for any help;	13
2	Learning from tutors	Email contact with tutor and colleagues at school was really helpful; Question to my tutors and observing other students question to our tutors; Raise a query to the tutor or some professional forums that I am a member of.	7

3	Learning from other students	From other students/colleagues doing similar or related programmes from other institutions	8
4	Seeking more resource and use of internet	Skim through more reference material, web browsing; used internet, studied material available at work, spoke to the colleagues but didn't go and ask them for help; Accessing friends' libraries	8
5	Managing self-condition management	Reading at night and doing assignment on time Long walks on the beach with the dog - giving me time out to think and put things into perspective.	2
6	Talking openly	Review material, chat to colleagues and friends, as well as tutors and other students; Talking openly with tutors, colleagues, friends and family members about my problems.	9
7	Judging by final result	To see the final result	1

5.3.4.4 Findings of strategies adopted for the use of technology

The item used to explore learning strategy in use of technology is 'The strategies which I used to improve the use of technology also include...'. Out of 151 participants, 43 participants answered with a single strategy and two participants provided multi-strategies (see Table 17).

Table 17. Responses on the strategies used to improve the use of technology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No strategy	9	6.0%	6.0%	6.0%
	Single strategy	43	28.5%	28.5%	34.4%
	Multi-strategies	2	1.3%	1.3%	35.8%
	Missing data	97	64.2%	64.2%	100.0%
	Total	151	100.0%	100.0%	

The findings show that strategies were used for different purposes, for example, the purpose of developing technology skills and the purpose of learning effectiveness. The data show that intentionally doing every day practice is the way students improve their technology skills. It was frequently used for effectively using of technologies and the number of responses is 11. Students also seek support about using technology from relevant staff and provided IT support. In addition, technologies were used for interactive learning and further research. The details and frequencies of each strategy are shown in Table 18.

Table 18. Findings of strategies for using technologies

No	Strategies	Examples	Frequency
1	Learning from everyday practice	Day to day use of computer, learning relevant programmes Day - to - day use gave me confidence and ability to improve my knowledge by using better IT techniques. Trial and error	11
2	Using provided support	Seeking advice from younger members of staff to help me search effectively Going to the induction sessions to understand what I have access to	4
3	Using technology for interactive learning	Using Skype for communication with team members Utilising 'Pebbelpad' for a portal for communication between team members	4
4	Asking external help	Seeking help from colleagues who had the required knowledge	4
5	Using technologies for further research	Having a wireless internet connection installed at home. Working primarily from the computer in research, compilation and publication of information	3
6	Using technology for reading	iPad for PDF course notes, e-books etc. iPad is fantastic - saving readings and studying on the go is much more effective than carrying folders of printouts	2

5.3.4.5 Findings of strategies used to deal with feedback problems

The item used to explore the learning strategies to deal with the problem of feedback is 'the strategies which I used for effective learning when I could not obtain feedback were ...'. 48 participants provided single strategy and five participants provided multi-strategy. 59.6% participants did not provide answers to this question. A lack of knowledge on dealing with feedback problems is again shown in this study. The details of these statistics are shown in Table 19.

Table 19. The responses on strategies used for dealing with feedback problems

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No strategy	8	5.3%	5.3%	5.3%
	Single strategy	48	31.8%	31.8%	37.1%
	Multi-strategies	5	3.3%	3.3%	40.4%
	Missing data	90	59.6%	59.6%	100.0%
	Total	151	100.0%	100.0%	

The explored strategies are categorised based on the types of the activities undertaken to maintain learning in spite of the problems of feedback. 13 kinds of strategies are defined from the data. Seeking human support is the most frequently used strategy and it was mentioned by 19 participants. Human supports include the support sought from peers, colleagues, friends and family. Learning from past feedback is another frequently mentioned strategy and 9 participants mentioned this strategy. The findings also include the strategies which a small frequency such as interacting with feedback and developing personal timetable were used by one student. The details and frequency of strategies used to deal with the feedback problems is shown in Table 20.

Table 20. Findings of strategies used in dealing with feedback problems

No	Strategies	Examples	Frequency
1	Seeking human (peer, seniors) support/interaction with others	Discussion with other students, discussing their approaches My family and friends are helping me in this state. Discussions with colleagues and professionals in my field regarding the work I had submitted and my understanding of it	19
2	Seeking answer by reading and studying / Learn from past feedback	Reread assignment questions multiple times and also while recording information to try and keep to the topic by responding with relevant information [it worked...sometimes] Used experience from last time to be more effective. Feedback more important, I would do this anyway.	9
3	Determination	Carry on! Keep on focusing on the bigger picture of what I am trying to achieve rather than looking at what has already gone. Persistent trying	6
4	Reviewing previous feedback	looking at the feedback from marking of assignments Used experience from last time to be more effective. Feedback more important, I would do this anyway.	5
5	Using documentation provided by university	Appreciate the student handbook and literatures that attached for learning is in great help I used the assessment criteria for the module	3
6	Self-evaluation	Compared my assignment results with expectations	3
7	Self-diagnose	I assumed what areas I was strong / weak in.	2
8	Using existing knowledge of learning	Refer to strategies learnt in my previous university	2

	strategy		
9	Engagement to get feedback	I always questioned the feedback and asked additional questions to the tutor's feedback to make sure I got enough feedback to satisfy myself. Several times I have received poor feedback in terms of explaining what I did right/wrong and that is not helpful!	1
10	Planning	Personal timetable	1
11	Learning from peers comments	Read the students forum and get feedback from there.	1
12	Seeking support from the content	The whole course has had to be approached without the benefit of detailed or effective feedback so it is largely a matter of using the online forum to find out what other students did and try to extrapolate the differences to identify areas for further study.	1
13	Learning based on self-interests	The coursework is relevant to my job so it is a joy to learn more	1

5.3.4.6 Findings of strategies used in preparing for evaluation

The item used to explore what strategies are used in preparing for evaluation is 'the strategies which I used for preparing assessments also include …'. 37 participants reported single strategy and 35 used multi-strategy for this question. 49% participants did not respond. Even though a decrease of the responses on open-ended questions reveals in the process of data collection, the provided details of the strategies show that participants have considerable knowledge of how to manage their study for preparing the assessment and assignment. The frequency and percentage of the theses responses are shown in Table 21.

Table 21. The responses on the strategies used for preparing assessments

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No strategy	5	3.3%	3.3%	3.3%
	Single strategy	37	24.5%	24.5%	27.8%
	Multi-strategy	35	23.2%	23.2%	51.0%
	Missing data	74	49.0%	49.0%	100.0%
	Total	151	100.0%	100.0%	

20 kinds of strategies were used by the students. Wider reading and deep learning was most frequently mentioned in preparing for evaluation by 15 participants. Seven students write and develop draft in preparation for the assignments and making notes is also adopted by seven participants. Some strategies were mentioned by a single participant. For example, panic

control was mentioned by one responders as ‘I am one of those people who panics with just the minimum amount of time left to get the assignment done, therefore controlled panic has become a motivational tool’. In addition, brain mapping is used within a systematic strategy, ‘usually mapping out the ideas and structure of the assignment; then assigning word limits to each section, using this as a basis of writing the assignment; then re-reading and connection the sections’. Furthermore, reducing the life distraction and maintaining motivation was mentioned by the students that ‘time is a great constraint when balancing family, work and study. Although you want to start early, distractions often get in the way, at other times motivation can be hard to find’.

The answers to this question show that some individuals developed unique strategies from their own experience. All details of strategies show their important role to the learners. Categorises and frequency of all these strategies are illustrated in Table 22.

Table 22. Findings of strategies used in preparing for assessment and/or assignments

No	Strategies	Examples	Frequency
1	Wider reading and deep learning	A wider and thorough research. Hard work and perseverance. Gathering all the information before start writing.	15
2	Writing and developing draft	Pre-assignment reading and contemplation, writing up rough draft from key issues. Trying to ensure completion was not rushed. Note date of hand in then work from there. I know roughly how long it takes me to write a 2000 word essay etc. Always doing one full draft and allowing time for extensive editing. Undertake background reading; prepare assignment structure to answer key themes. Create headings, fill in detail. Review, Submit.	7
3	Making notes and ideas	Making notes, jotting down ideas for each assignment question asked. I make little notes every week in my assignment folder before writing full summary closer to the deadline. I then expand quoting relevant references and bibliography in the process.	7
4	Deeply understanding the questions	Plan out sections understand what the question actually wants. It is not often clear from assignment wording what content is required for them on first reading so they need to be thought about a lot.	6

5	Seeking support /proof reading	Prepare a draft and give it to someone for proof reading Attempting previous assignments and get feedback from colleagues and senior students as well as tutors.	6
6	Assignment focus	Read the assignment at the start of the module so you can study with purpose and begin to formulate an answer (or at least realise when part of the answer arrives during the study) as you study. Prepare a first draft, revise it, re-read it, refine it, and submit only when delivery date was due to give maximum time for thinking, refining and adaptation. I always start the course by looking at the assessment questions so I can focus my learning around the assignments. If I've read the questions before I do the readings they are in the front of my mind so it is easier to flag up relevant quotes etc. I also start the assignment at the earliest point I can and get my parents (who are RICS surveyors) to check it before I hand it in. I always use the forums to see where others are going with their answers.	6
7	Focusing on the questions and structure answers	I always start the course by looking at the assessment questions so I can focus my learning around the assignments. If I've read the questions before I do the readings they are in the front of my mind so it is easier to flag up relevant quotes etc. I also start the assignment at the earliest point I can and get my parents (who are RICS surveyors) to check it before I hand it in. I always use the forums to see where others are going with their answers.	4
8	Breaking down the tasks	Breaking down the question into manageable elements, approaching those parts that I deemed easier first to give me more time to focus on the more difficult elements.	3
9	Learning from previews exams	At least to have an hour of reading on a single module every day. Employ work based experience to gain an effective understanding of notes and questions The programme was, for the most part, a paper based system, i.e., the learning material and self-assessments were provided in work book format. this worked extremely well.	2
10	Relating to real life	I try to do all my research for real life examples early, I find they help me to start really thinking about the way I am going to answer the question. I related all my study to my work context which made it more useful and also made me more motivated.	2
11	Gathering all the information before start writing	Gathering all the information before start writing.	2
12	Controlling panic	I am one of those people who panic with just the minimum amount of time left to get the assignment done :-) controlled panic as a motivational tool.	1
13	Brain mapping	Usually mapping out the ideas and structure of the assignment. Then assigning word limits to each section,	1

		usually breaking my sections down into smaller sections (about 100 words each). Using this as a basis of writing the assignment. Then re-reading and connection the sections.	
14	Finish early	Finish early	1
15	Checking and proof reading	Having the assignment ready at least 1 week ahead and having it proof read by someone, even if it was only for spelling mistakes.	1
16	Perseverance	Hard work and perseverance	1
17	Reducing distraction	Time is a great constraint when balancing family, work and study. Although you want to start early, distractions often get in the way, at other times motivation can be hard to find.	1
18	Managing psychological dynamics	1. What to do 2. How much time I have 3. Spread out the time 4. Safety net: time out for leisure and technical fault in technology...so that I will not under stress and imbalanced mood unnecessary.	1
19	Using provided support	Attended the seminars to get face to face discussions with the lecturer.	1
20	Focusing on a single question	Answering one question at a time.	1

5.3.5 Summary of the use and development of learning strategies

The findings show that the most of the illustrated learning strategies are used by the majority of participants and a number of new learning strategies emerged from students' experience. These findings shows that learning strategy/ies is/are used in all students' experience and high creativity and engagement implies it's important to individual learner. Findings in this section thus support on the hypothesis which suggests the key of distance learning success is the use of strategy. The roles of the strategies students used in their experience to deal with difficulties in their self-learning environment are analysed in the following section.

5.4 Analysing the role of learning strategies

The findings in Section 5.3 indicate that the nature of DE has common influences on the students and learning strategies are generally used as a necessary activity in distance learning. The details of those strategies provide how particular situations were managed. This section contains the analysis of the role of learning strategies to different types of problems. Three types of learning strategies that are used as a framework of this thesis are categorised based on the original purpose of these strategies. These are: self-directed strategies (i.e. strategies by which the student decides *what* to;; self-regulated strategies (whereby the student manages his/her time and learning environment); and cognitive strategies (i.e. where the student is

reflecting on the psychology of learning and taking appropriate action). Please refer to Section 2.4.2 for the basis of these concepts in the literature.

Three types of learning strategies that are used as a framework of this thesis are categorised based on the original purpose of these strategies. These are: self-directed strategies (i.e. strategies by which the student decides *what* to;; self-regulated strategies (whereby the student manages his/her time and learning environment); and cognitive strategies (i.e. where the student is reflecting on the psychology of learning and taking appropriate action).

5.4.1 Use of self-directed strategies

5.4.1.1 Role of self-directed strategies

Strategies used for self-direction in distance learning shows that students experience difficulties in a variety of difficulties. Learning strategies show students' solutions when dealing with difficulties. The details of using learning strategy firstly suggest that it is difficult for students to carry out their learning activities. Despite being provided with materials and guidance by the institutions, the absence of face-to-face communication causes confusion in the direction on learning activities. Learning is a cognitive process which occurs step by step with a structured body of knowledge. A predesigned package of materials shows the whole picture of what should be done, but what should be done in a single learning activity need to be decided by students themselves. In comparison, for on-campus students, learning activities are guided by the design of each session (for example, the lecture and seminar), and learning content is structured piece by piece within the learning period. In distance learning, the guidance of each session is absent. Instead of tutors' efforts, students directed their own learning process by using relevant strategies. The development of the role of using strategies in self-direction is illustrated in Figure 31.

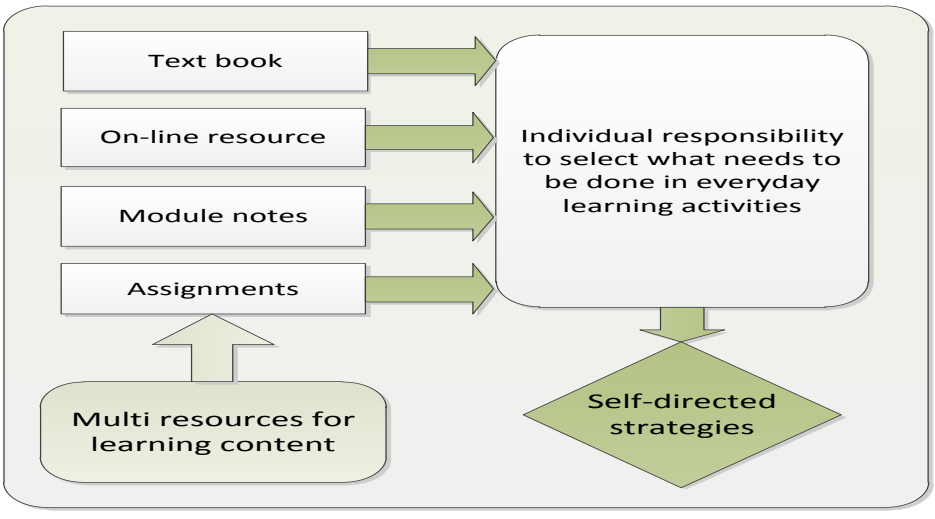


Figure 31. The role of self-directed learning strategies

Referring to Figure 31, multi-resources are provided to students in order to facilitate learning. Distance learners must manage their learning from a 'package' of learning materials such as text books, on-line recourse and module notes. Learning strategies therefore are developed to achieve this purpose. The strategies which are used for seeking the directions of learning are categorised into self-directed strategies. The data show that self-directed strategies were used to find:

- direction of what should be deeply understood within the whole learning package
- direction of achieving wide and deep knowledge
- direction of obtaining the whole picture of the knowledge
- direction of understanding the questions
- direction of the main points of preparation
- direction of managing the preparation in a long-term study

5.4.1.2 Applications of self-directed strategies

Relevant findings of how strategies were used for these purposes are categorised and described in details in this section.

Sought direction of what should be deeply understood within the whole learning package

The strategies of focusing on main points, assignment and problems in reading, understanding and preparing for assignments shows the difficulty in finding the direction of what should be done in a period of time during the learning process. Firstly, 29 participants highlighted that note taking was used as a strategy when they read the learning materials it is applied in different ways. For instance, ‘writing in margins to ensure retention and comprehension’, and ‘I tend to create my own notes to go over and summarise what I've learnt’. In addition, ‘focusing on main points’ was mentioned by 14 participants. The focuses are mentioned as assignment-based learning focus, expected learning outcomes mentioned in hand-outs, main areas identified in the module forums and the important points identified by the students. Examples of this are: ‘read bits and pieces that would apply to the assignments only’, ‘targeting what I needed to learn and reading appropriate texts accordingly’ and 'relating to the assignment questions in order to focus my reading'. Furthermore, ‘highlighting crucial areas’ is identified, and being mentioned by 13 participants, and often combined with taking notes. For example, ‘highlight the important point while reading and making a note’, and ‘giving marks on important sentences, wherever I am always trying to read a book’. The strategies used to find a direction in reading also include, ‘finding and following guidance’, participants sought and used guidance in their reading. The importance of reading guidance provided by the university was suggested to the participants, ‘the guidance from the university on specific readings for different topics was really important’. Finally, the selection of reading

material was found from the statement of ‘selection of the most important available reading on the topic, going through abstracts and overviews’.

Sought direction of achieving wide and deep knowledge

The strategies of highlighting and reviewing show how to solve the problems of cognition in achieving wide and deep knowledge. One student responded that, ‘course materials provided by the university were read at home together with performing internet searches to find resources; reading of books is often carried out on the train and main elements noted down or highlighted as necessary’. In addition, the data show that 23 students do ‘extensive research’ and ‘extra reading’, in order to understanding the learning content. The ‘extra reading’ explained by different students includes: work-related documents, internet and articles, history of the subject, library books, examples/case studies, journal article abstracts and internet resources. Furthermore, focusing on what is required and what needs to be further understood was found in four participants’ experience by ‘writing down what is required and crossing off once achieved’, ‘underling examples in the text to ensure understanding and re-reading if focus is lost’ and ‘focusing on the problems highlighting and making notes’.

Sought direction of obtaining the whole picture of the knowledge

Direction of obtaining the whole picture of the knowledge was guided by the text book in students’ experience. Also, ‘using directions provided by the programme’ was described by six participants. They apply this strategy through ‘reading and understanding the learning objectives before I start reading the whole content’, ‘reading the module booklet and reader helped me to do this’, and 'reference to guidelines as I read along’.

Sought direction of understanding the questions

The strategies used in preparing for assessment/assignments show the difficulty to understand the questions. Carefully understanding the questions of assignment were mentioned by six participants. Data show that they carefully understand the questions in the assessment/assignment. For example, ‘plan out sections understand what the question actually wants’ and ‘it is not often clear from assignment wording what content is required for them on first reading so they need to be thought about a lot’. One student expressed that

> Printing the assignment paper and having it in hand every time I left home. Any free time I have at work I searched the internet for relevant information pertaining to what the assignment may be asking and downloading them for review and use them later when compiling the assignment for final submission.

In the case of using provided support systems, the data show the strategy of 'attending the seminars to get face-to-face discussions with the lecturer'.

Sought direction of the main points of preparation

Direction of the main points of preparation was achieved by the details of how students focus on preparation to do the assignments. For example: 'read the assignment at the start of the module so you can study with purpose and begin to formulate an answer'; 'I always start the course by looking at the assessment questions so I can focus my learning around the assignments'; 'Read the question and understand it first ….. read the questions again and assess if it is possible to start or not. In addition, one student replied 'answering one question at a time'. Focusing on a single question is then defined as a leaning strategy.

Sought direction of managing the preparation in a long-term study

Planning and starting early were used to find the direction of managing the preparation in a long-term study. These are discovered from students' statements of what strategies were pursued in preparing assessment/assignment from the data. Planning was used with technologies such as 'using Gantt Charts, and other relevant Milestone planning tools'. In addition, starting early is analysed from the statement of 'early research' and 'conducting research early so that all relevant information is available when writing assignments'.

5.4.2 Use of self-regulated strategies

5.4.2.1 Role of self-regulated strategies

Data show that distance learners face many distractions during the learning process. They do not study in a well-managed classroom environment and do not have instructors to inspire them via face to face contact unlike on-campus students. The findings show strong evidence of the importance of self-regulation in student learning experiences. The use of self-regulated learning strategies shows that it is difficult to manage learning activities when faced with the distractions of personal life, work and uncertainty. Students need to manage the situation in order to allow their learning activities to take place successfully. In comparison, on-campus students have their learning activities managed and monitored by following a timetable, in a suitable classroom environment, participating in tutor-designed activities and informal activities with peers. Those conditions are produced by a team of both academics and non-academics. In distance learning, the condition of 'learning environment' is changed and the provided classroom conditions for learning are absent. Students need to self-manage, self-monitor, self-motivate and seek support in distance learning. Figure 32 shows the role of strategy in student self-regulation.

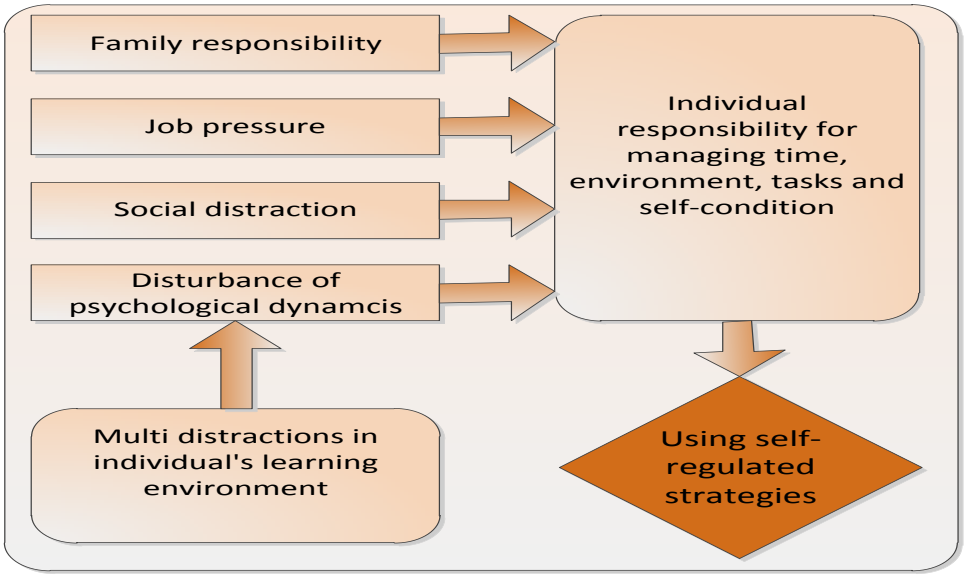


Figure 32. The role of self-regulated learning strategies

Figure 32 presents how learning strategies were used in self-regulation. It shows that multi-factors in an individual's learning environment distract the student learning process. These distractions include family responsibility, job pressure, social distraction and disturbance of psychological dynamics. Individuals need to take their own responsibility to manage their time, learning environment, tasks of learning and their own condition as a learner. Learning strategies therefore are developed for self-regulation. Those strategies are categorised as self-regulated strategies. Therefore, self-regulated strategies have the role of maintaining learning activities and its effectiveness in a complex learning environment.

5.4.2.2 Applications of self-regulated strategies

Findings of self-regulated strategies include the strategies used in managing the learning process of reading materials, self-management for achieving cognitive efficiency, seeking support, using technologies, dealing with feedback problems and effective preparation for assessment/assignments. These strategies show the difficulties within students' experiences. This section analyses those difficulties to explain the role of self-regulated strategies.

Self-regulation whilst reading learning materials

While reading learning materials, it is firstly difficult for students to manage the time in completing the task. Strategies used for completing the reading in an expected time period are, 'controlling the reading speed', 'always to be a faster reader' and 'planning the week well by making sure I read something and etc'. Secondly, organising the learning material was appeared in self-responsibility, for example, relevant strategies include, 'organise reading material into relevant sections and make notes of salient points for future reference', and 'organising all learning materials provided online in a file and marking off when full reading

has been satisfactorily achieved'. Thirdly, the effectiveness of reading are managed by the students. The data show that students use supportive technology, documentation and skills in their experience. New technology products and computer programmes are used to read the papers when they reading on screen. For example, 'using technologies for effective reading by having a program that reads out loud as I am reading it on the screen', 'using a dictaphone to read out the text and play it back to myself', 'and 'iPad is fantastic - saving readings and studying on the go is much more effective than carrying folders of printouts'. This assists in learning for. There are also other strategies were used for self-regulation in reading activities, such as, summarising, 'break down task', 'starting from most important points', 'mind mapping', 'discussion with others'.

Self-regulation whilst understanding learning content

Whilst understanding learning content, use of strategies shows student effort on solving the problems of understanding the content. Interactions were used to seek support from others to solve these problems. In addition, use of dictionaries shows the language difficulty for those who are not studying in their first language. Furthermore, the use of self-evaluation as a strategy indicates a lack of feedback in evaluation the learning outcomes.

Self-regulation whilst seeking support

Whilst seeking support, learning strategies show that students need to i) reduce pressure and negative feelings in isolated learning environment. Data show a high level of pressure in an isolated environment. Interactions appeared in the responds. Students learnt from tutors by 'email contact with tutors and colleagues at school was really helpful', 'questions to my tutors and observing other students' questions to our tutors' and 'raising a query to the tutor or some professional forums that I am a member of'. Also, talking about the study openly to other people are mentioned by the students, such as, 'talking openly with tutors, colleagues, friends and family members about my problems' and 'talk to as many people as possible. ii) Managing personal condition as a learner. The data showed that the participants managed their own conditions for effectively sought learning. For instance, 'long walks on the beach with the dog - giving me time out to think and put things into perspective'. iii) The use of strategies in seeking resources shows that geographic distance produces difficult access to learning resources. Seeking more resources and use of internet were stated by the students as 'researching on the internet for guidance books' and 'accessing friends' libraries were the strategies used for seeking support. iv) When using provided support is mentioned as a strategy, the general awareness of these strategies and taking action to use this support emerged as a problem area.

Self-regulation whilst using technologies

Strategies developed to use technologies show the difficulty of technology skills. On the other hand, they also show the knowledge and skills students develop to use technology for effective learning. The data show that intentionally doing every day practice is the way students improve their technology skills. It is supported by the statements 'always use the technology and explore the different options available', 'day - to - day use gave me confidence and ability to improve my knowledge by using better IT techniques', and learning from 'trial and error'. In addition, students seek provided support about using technology from relevant staff and provided IT support. Students stated that they, 'seeking help from colleagues who had the required knowledge', and 'seeking advice from younger members of staff to help me search effectively'. Student asked help from outside the programme and it was emerged in 4 students' experience. For instance, 'seeking help from colleagues who had the required knowledge'.

Self-regulation whilst dealing with feedback problems

Strategies used in dealing with feedback problems show the difficulties of evaluating of what have been done, diagnosing weak areas of learning, developing solutions for problems created, maintaining learning activities.

The practice of seeking answers from past feedback, learning content, and others firstly proves the difficulty of evaluating what students have done and continuing to work on the right track. Strategies used to deal with this difficult include: seeking human support (for example, 'looking at the feedback from marking of assignments, good dialogue and discussion with tutor' and 'revisiting the issues mentioned in the feedback and discussing with other students'), reviewing of previous feedback (for example, 'looking at the feedback from marking of assignments, good dialogue and discussion with tutor' and 'revisiting the issues mentioned in the feedback and discuss with other students'), interacting with feedbacks was identified (for example, 'I always questioned the feedback and asked additional questions to the tutor's feedback to make sure I got enough feedback to satisfy myself. Several times I have received poor feedback in terms of explaining what I did right/wrong and that is not helpful!'.

In addition, to deal with the feedback problems, students diagnose their self-weakness and self-strength, using quizzes to do self-evaluation, refer to strategies learnt in previous university, and identify 'the gaps in knowledge and focus on these gaps'.

Furthermore, it is difficult to develop solutions for problems created; Evaluating self-achievement based on their marks was mentioned as a solution. For example, one student stated that 'comparing my assignment results with expectations. Reviewed what minimal feedback there was with what I had done/submitted'. Self-solutions also include developing

personal timetable; learn from peers' comments to deal with the problems on feedbacks and 'reading the students' forum and get feedback from there'.

Finally, maintaining learning activities appears as a difficult in student experience. The data show that students determinate themselves in everyday work and focus on future. This was pointed out by a number of students such as 'carry on!', 'just going through the work at the suggested pace', 'continuous learning from the modules and book' and 'persistent trying'. In addition, using existing knowledge on learning strategy was found in two students' experience and using the provided documentations is another solution , those documents include students' handbook, provided literature, assessment criteria and module notes.

Self-regulation whilst preparing for evaluations

Whilst preparing for the evaluations, student use of self-regulation strategies firstly shows the problem of high pressure and panic. Panic control was mentioned by one responders as 'I am one of those people who panics with just the minimum amount of time left to get the assignment done, therefore controlled panic has become a motivational tool'. In addition, the impact of distractions shows in one response as 'time is a great constraint when balancing family, work and study. Although you want to start early, distractions often get in the way, at other times motivation can be hard to find'. One student mentioned how psychological dynamics was managed by a step by step strategy, '1.What to do. 2. How much time I have. 3. Spread out the time 4. Safety net: time out for leisure and technical fault in technology...so that I will not under stress and imbalanced mood unnecessary'.

Secondly, it is difficult for the learners to manage their tasks and time. Findings show that writing and developing draft was used in preparation for the assignments. Breaking down tasks was used as 'I usually breaking my sections down into smaller sections (about 100 words each)', and 'Breaking down the question into manageable elements, approaching those parts that I deemed easier first to give me more time to focus on the more difficult elements'.

In addition, 'Gathering all the information before starting to write' is the strategy included in two responds' experience; and brain mapping is used as, 'usually mapping out the ideas and structure of the assignment, then assigning word limits to each section, using this as a basis of writing the assignment and then re-reading and connection the sections'.

Moreover, finish early, checking and proof reading, hard work and perseverance were used in regulating learning experience. Effectiveness of the planning is also considered through 'planning correctly, planning early, obtaining texts early, peer support, tutor advice'. Also, developing an understanding of the broad knowledge is a main point in preparing assessments and assignments. For example, wider reading and deep learning, mentioned by 15 participants

was the most frequently used strategy for preparing assessments/assignments. One student expressed ‘a wider and thorough research’ to the question. Fourthly, to ensure the quality of the work, proof reading was used as a strategy, for example, ‘prepare a draft and give it to someone for proof reading’ and ‘attempting previous assignments and get feedback from colleagues and senior students as well as tutors’.

5.4.3 Use of cognitive strategies

5.4.3.1 Role of cognitive strategies

Due to the fact of DE students learn in a self-managed environment, their selections of strategy for cognitive efficiency show their awareness of how to learn. These strategies used for cognitive efficiency show that it is necessary for students to manage their self-condition for learning effectively. Students manage their emotions, brain’s function, memories and thinking processes through their own efforts. This is facilitated by tutors’ efforts in on-campus education by engaging in interaction after a period time of concentration to avoid mental fatigue. However, the knowledge of educational psychology which the tutors apply in conventional teaching is absent from distance learning. Students teach themselves in their self-learning process. The data show that some students already manage their cognitive process with ideas related to educational psychology. The role of strategies in increasing cognitive efficiency is shown in Figure 33.

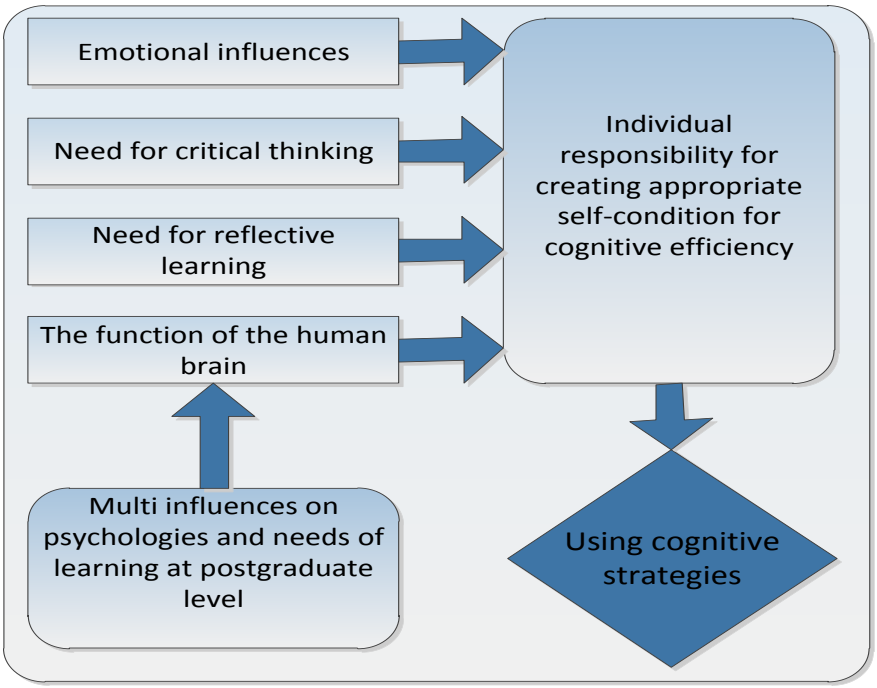


Figure 33. Role of strategies to cognitive efficiency

Referring to Figure 33, the multi-influences on psychologies and needs of learning in DE causes emotional influences, the need for critical thinking, the need for reflective leaning, and proper use the function of human brain. Individuals are responsible for creating appropriate self-condition to achieve cognitive efficiency. Cognitive strategies are therefore used in attempt to obtain cognitive efficiency in distance learning process.

5.4.3.2 Application of cognitive strategies

Strategies used for cognitive efficiency are found in reading materials, understanding the learning content, dealing with feedback problems and preparing assessment and assignments. Those strategies show that students made self-effort to 1) managing their self-condition for better cognitive efficiency. For example, 'Taking short breaks; try remaining fully focussed for some time'. 2) Memorising the content. For example, ‘taking notes, reading the same thing more than once’ and ‘I read each of the course notes front to back and then went back when completing assignments, I only used published books to find additional information’. ‘reading over and over again’ and ‘making notes as I go. Anything I didn’t understand I came back to once I had finished my reading’. 3) Deep understanding, ‘Relating to previous reading materials’ was used for better understanding in three participants’ experience. Participants obtain ‘materials from past courses that were relevant to the subject matter’ and ‘planning and organising my workload, making use of past question papers contributing to discussions’. Making notes and summarising the reading content was used to facilitate students’ understanding. One student stated that ‘taking fully comprehensive notes whilst reading helps me digest material more thoroughly and saves time when it comes back to revision times as I make it easier to read and I am more familiar with it’. In addition, Brain mapping and imagination was used by three students. For example, ‘drawing diagrams in my own style helped with ensuring that the content was understood in my way of learning’ and ‘bullet pointing important content, mind maps and verbal dictation of material to assist my preferred learning technique’. Also, giving time to understand and it was mentioned by one student.

Strategies used for cognitive efficiency was found in using learning technology. For example, ‘iPad for PDF course notes, e-books etc.’, ‘iPad is fantastic-saving readings and studying on the go is much more effective than carrying folders of printouts’.

Fourthly, strategies were used for achieving cognitive efficiency in preparing evaluation. For example, 'making notes, jotting down ideas for each assignment question asked'. Secondly, learning from previous examinations and two participants used this strategy. Thirdly, two participants indicated that relating to real life experience is helpful and the details are described as 'I try to do all my research for real life examples early, I find they help me to start really thinking about the way I am going to answer the question'.

5.4.4 Summary: use of learning strategies is essential to deal with difficulties

In summary, students come across various difficulties in their own learning experience and learning strategies are their self-solutions to deal with these difficulties. These strategies are used for different purposes and are significant for learning effectiveness in different ways. For instance, self-directed strategies are significant for deciding what should be done; self-regulated strategies are significant for managing learning activities (how it can be done); and cognitive strategies are significant for achieving cognitive efficiency (how it can be effective). The evidence presented shows that learning strategies have an important function in solving the problems caused by the characteristics of DE (e.g. lack of teaching influences and tutor's guidance), disturbs of personal life, design of DE delivery (for example, use of technology and design of learner support), and condition of the learner. It is important to realise that the category of the strategies does not matter; the same strategy can be used for different purposes and applied in a creative way.

Based on this approach, this thesis re-defines the types of learning strategy based on an emphasis of the role of strategies. As shown in the findings and analysis in this section, students who take their own responsibility in self-direction and self-regulation do so for the purpose of cognitive efficiency and this include use of resource. Therefore, this thesis designs a framework of the components of metacognition. This includes the components of *awareness, ability, motivation* and *evaluation.* Students' metacognitive capability allows them to reflect on their activities of using strategies such as those discovered in this research project: *self-directed strategy, self-regulated strategy* and *cognitive strategy*. The components and reflection of metacognition are shown in Figure 34.

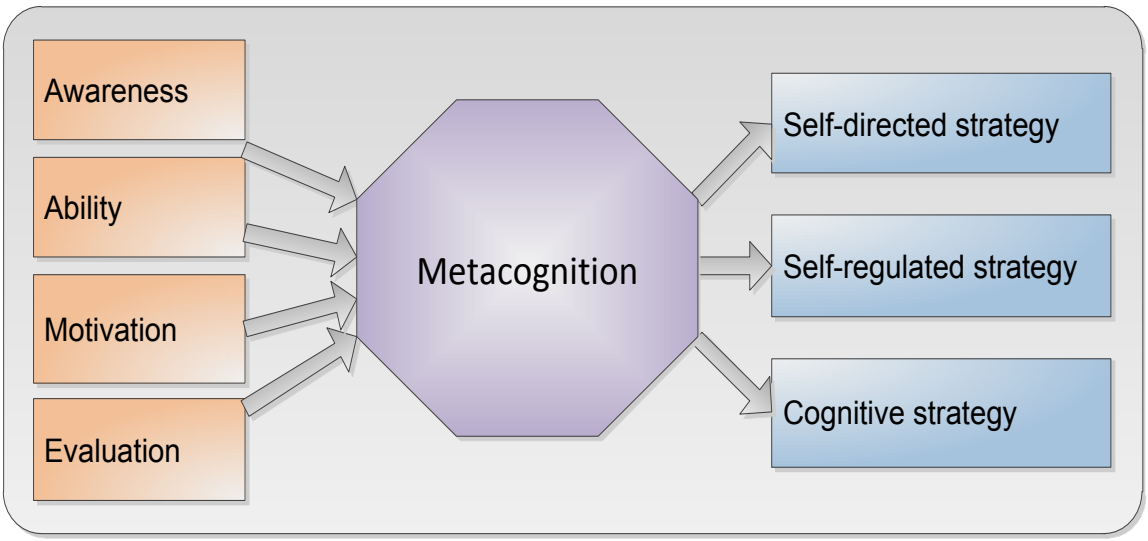


Figure 34. Proposed model of metacognition in distance learning experience

As shown in Figure 34, metacognition contains four basic components, i.e., awareness, ability, motivation and evaluation. Students' capability of metacognition is indicated by what and how learning strategies are used in self-direction, self-regulation and cognitive efficiency. This model is updated from five components of metacognition which was developed in Section 4.3.1. Based on this proposed model, the potential improvement of metacognitive capability can be analysed based on their level of awareness, ability, motivation and evaluation. This is further analysed in Section 6.3.

5.5 Effectiveness of learning strategy

The identification of the key to distance learning success is further tested through the analysis of the effectiveness of learning strategy. Firstly, the role of interaction in distance learning has been argued and re-identified as a learning strategy for distance learners. Its effectiveness is evaluated based on students' self-reports. Secondly, effectiveness of learning strategy is considered according to its influences on marks, feelings of isolation, student engagement and obtained knowledge. Correlations between learning strategies and these factors are analysed.

5.5.1 Correlation analysis

Effective distance learning experiences need to consider positive experiences, such as less feeling of isolation and distraction, encouraged engagement and achievement in the required knowledge. This section therefore analyses the effectiveness of learning strategy through its correlations with multi-factors i.e., feelings of isolation, distraction, engagement, self-evaluation of knowledge acquisition and marks.

Relevant techniques are available for correlation analysis; for example, the Pearson correlation coefficients (r) and Spearman Rank Order Correlation (ρ) are designed to evaluate the correlation between two variables. The selection of the technique is based on the nature of the variables. 'Pearson's r is designed for continuous variables …and Spearman's ρ is designed for use of ordinal level or ranked data' (Pallant, 2010, p.128). In this study, the variables in relation to the use of strategy and overall learning experience are ranked data (five-point Likert scale); Spearman's ρ is therefore selected. In addition, different authors suggest different interpretations to the output of correlation analysis. Cohen (1988, p.79-81) suggests the following guidelines: Small ρ=.10-.29, medium ρ=.30-.49; large ρ=.50-1.0. This thesis refers to Cohen's theory in interpreting the outputs of Spearman's correlations analysis.

5.5.2 Relationship between learning strategy and marks

Overall, 80 of the participants have an average mark of 60-69, 36 achieved 50-59, 23 were awarded 70-79, four of them are 80 and above, two scored 40-49, and one participant's

average mark was under 40. The missing data is 5. The frequency of the average marks is shown in Figure 35.

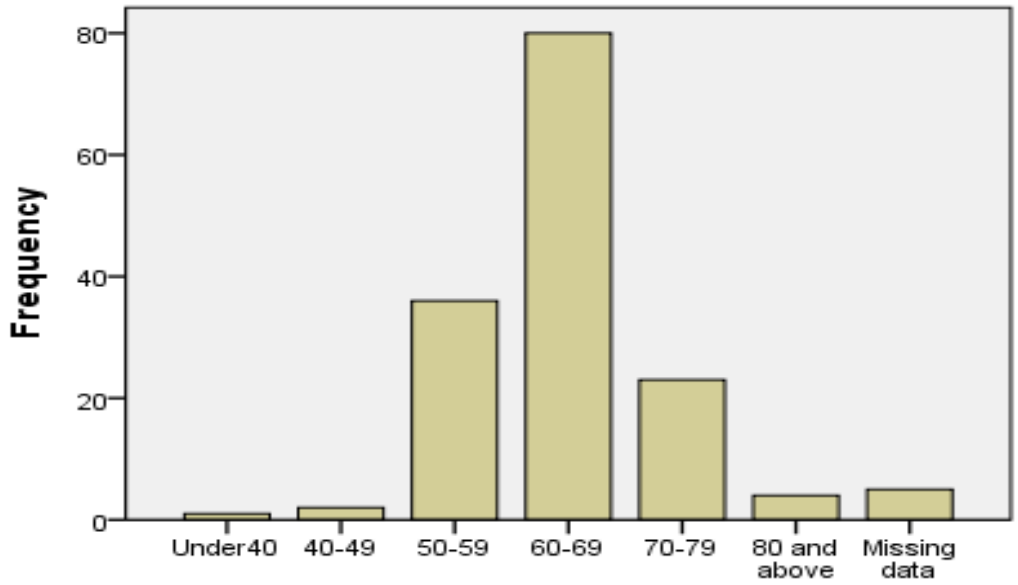


Figure 35. The frequency of average marks

The influences of learning strategies on average marks are measured through their correlations. The findings show that within all the illustrated strategies, level of average mark is significantly correlated with reflection on existing knowledge (ρ=.265, p=.001). This suggests that most learning strategies do not influence the level of marks.

Effectiveness of learning strategy was previously discussed in relation to its influences on marks (Jegede *et al.*, 1999; Anderson, 2007). However, the outputs of correlation in analysing survey data show students' level of satisfaction with marks is unreliable. The outputs of correlation analysis indicate that the level of satisfaction with marks have significant correlations with the average level of marks (ρ=0.228, p=0.005). This suggests that students who received higher marks feel more satisfied with the given marks. A lack of reliability in the level of students' satisfaction is predicted by the findings. It is therefore argued in this thesis that the evaluation of the success of DE should not depend on students marks.

5.5.3 Relationship between learning strategy and feelings of isolation

Feelings of isolation are a major problem in distance learning experience and learning strategy is used to seek positive learning experience. Therefore, the effectiveness of learning strategy is tested through its correlation with feelings of isolation.

Findings of student experience of isolation show that within the responses to 'I feel isolated in distance learning', 6.6% selected Strongly disagree, 35.1% selected Disagree, 19.9% selected

Neutral, 29.1% selected Agree, and 9.3% selected Strongly agree. The statistics suggest that 41.7% of participants did not feel isolated in distance learning, compared to 38.4% participants who agree and strongly agree that they were isolated. This research therefore reveals that isolation is not a general problem for most participants. Findings of student experience of isolation are shown in Table 23.

Table 23. Findings of feelings of isolation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	10	6.6%	6.6%	6.6%
	Disagree	53	35.1%	35.1%	41.7%
	Neutral	30	19.9%	19.9%	61.6%
	Agree	44	29.1%	29.1%	90.7%
	Strongly agree	14	9.3%	9.3%	100.0%
	Total	151	100.0%	100.0%	

In addition, the correlations of learning strategy and feelings of isolation are tested. The outputs of correlation analysis show that *feelings of isolation* are significantly correlated with *time management* (ρ=-.236, p=.004), *goal setting* (ρ=-.265, p=.001), *goal checking* (ρ=-.202, p=.013). There is no significant correlation between other strategies and feelings of isolation. The significant correlations are selected in Table 24.

Table 24. Correlations between feelings of isolation and use of strategy (rho)

			Time management	Goal setting	Goal checking
Spearman's rho	Isolation	Correlation Coefficient	**-.236****	**-.265****	**-.202***
		Sig. (2-tailed)	.004	.001	.013
		N	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

These statistics suggest that students who use time management, goal setting and goal checking in their learning experience are less likely to feel isolated. The effectiveness of using these strategies is proved to reduced feelings of isolation in distance learning.

5.5.4 Relationship between learning strategy and student engagement

To understand student engagement in their invisible learning process, the maximum, minimum and average numbers of hours participants spend on distance learning per week are

researched in the survey. The findings show that the range of maximum hours is 76 (from 4 to 80), the range of minimum hours is 30 (from 0-30), the range of average hours is 46 (from 1-47). The descriptive data of minimum hours is shown in Table 25.

Table 25. Descriptive statistics on student engagement peer week

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Maximum hours	151	76	4	80	21.91	11.459
Minimum hours	151	30	0	30	6.07	5.438
Average hours	151	46	1	47	11.77	6.312
Valid N (listwise)	151					

These statistics suggest a notable difference within student engagement between individuals, particularly the maximum hours. As mentioned by one participant, the maximum hours increased dramatically during assessment time. Therefore, the findings on maximum hours and the influences of this on average hours are not reliable to analyse the influences of learning strategy on student engagement. Alternatively, a minimum number of hours is a reflection of students' continued engagement (for example, 0 means students do not engage in learning activities on a regular basis). Therefore, the findings of on the number of minimum hours students spend on distance learning per week are selected to show student engagement in DE.

The details of data (Figure 36) show the number of responses for 21 hours, 25 hours and 30 hours is 1. The data is not valid for correlation analysis because each cell of the category should be more than 5 (Pallant, 2010). Therefore, the findings for minimum hours are re-categorised. The mode of the statistics is considered in the process of re-category. Within the findings, multiple modes exist, which includes 0, 5, and 10 hours with a frequency of 23. In considering the special meaning of 0 in student experience and the existing modes, the new categories of student engagement of minimum hours spent on distance learning per week are 0, 1-4, 5-9, 10-14, 15-19, 20 and above. The details showing minimum engagement per week include 15.9% of participants who spend 0 hours minimum, 29.1% of participants spend 1-4 hours, 27.8% of participants spend 5-9 hours, 19.2 % spend

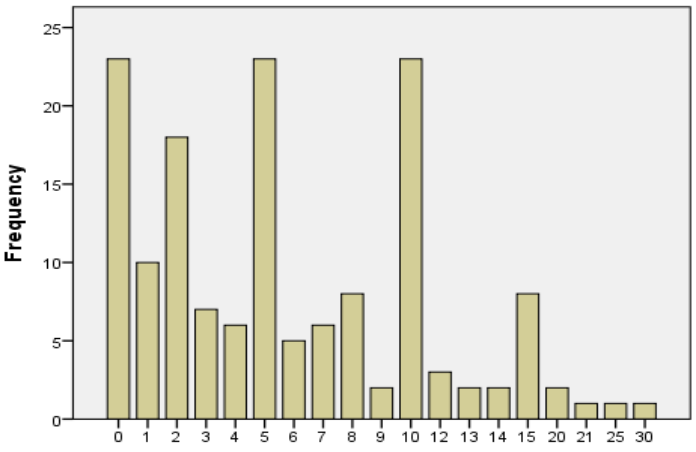


Figure 36. Minimum hours per week

10-14 hours, 4.6% spend 15-19 hours and 3.35% of participants spend 20 hours and above. The frequency of each category is shown in Table 26.

Table 26. The frequency of minimum hours per week

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0 hour	24	15.9%	15.9%	15.9%
	1-4 hours	44	29.1%	29.1%	45.0%
	5-9 hours	42	27.8%	27.8%	72.8%
	10-14 hours	29	19.2%	19.2%	92.1%
	15-19 hours	7	4.6%	4.6%	96.7%
	20 hours and above	5	3.3%	3.3%	100.0%
	Total	151	100.0%	100.0%	

The influences of using learning strategy on student engagement are evaluated through Spearman rho. Within the correlations of minimum hours with all selected learning strategies, the statistics show that *minimum hours spent on distance learning per week* is significantly correlated with *goal setting* (ρ=.296, p=.000), *goal checking* (*ρ*=.299, *p*=.000), *time management* (*ρ*=.391, *p*=.000), *planning* (*ρ*=.313, *p*=.000), and *starting early* (*ρ*=.406, *p*=.000). These significant correlations are shown in Table 27.

Table 27. Correlations of minimum hours and learning strategies (Spearman rho)

		Goal setting	Goal Checking	Time Management	Planning	Start early
Minimum hours	Correlation Coefficient	**.296****	**.299****	**.391****	**.313****	**.406****
	Sig. (2-tailed)	.000	.000	.000	.000	.000
	N	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

To interpret the outputs of the correlation analysis, students who set and check goals and manage their time are more likely to keep their minimum engagement on learning; in addition, these students are more likely to plan their work and start early in preparing for evaluation. The effectiveness of learning strategy in distance learning experience is proved by the positive influences of goal setting, goal checking and time management on greater engagement.

5.5.5 Relationship between learning strategy and obtained knowledge

The item, 'How well do you think you're doing on your distance learning programme, based on your satisfaction with the knowledge you obtained and your learning experience?', is designed to collect the data on students' satisfaction with their obtained knowledge. The findings show 61.6% of participants selected Well, 13.2% selected Very well, 21.2% selected So-so, and 4% of participants selected Not well. The frequency of the student self-evaluation of their obtained knowledge is shown in Figure 37.

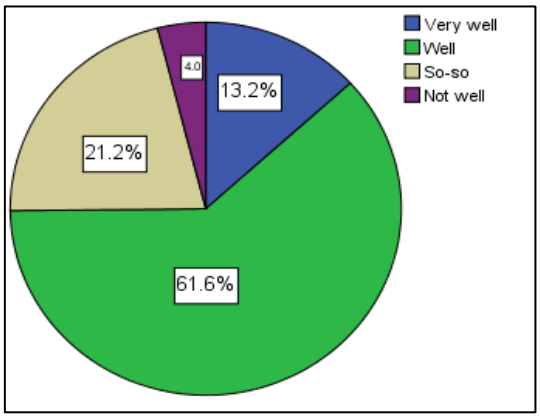


Figure 37. Self-evaluation on knowledge obtainment

The correlation between use of strategies and self-evaluation of obtained knowledge is evaluated. The correlation tests show that *level of satisfaction with obtained knowledge* is significantly correlated with *environment management* (ρ=-.263, p=.001), *time management* (ρ=-0.390, p=0.000), *seeking support from colleagues* (ρ=-.215, p=.008), *planning in preparing assessment / assignments* (ρ=-.313, p=.000), and *early start* (ρ=-.260, p=.001). These strategies are all negative and significant at 0.01 level (see Table 28). This indicates that students who adopt these strategies in their experience are not particularly satisfied with the knowledge obtained in distance learning. A strong relationship between use of strategies and expectation of more knowledge is proved.

Table 28. Correlations with satisfaction with obtainment (Spearman rho)

		Self-evaluation of obtained knowledge	Environment management	Time management	Seeking support from colleagues	Planning	Starting early
Self-evaluation of obtained knowledge	Correlation Coefficient	1.000	**-.263****	**-.390****	**-.215****	**-.313****	**-.260****
	Sig. (2-tailed)	.	.001	.000	.008	.000	.001
	N	151	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

5.5.6 Summary: significance of learning strategies

In summary, the effectiveness of learning strategy is analysed in this section and the statistics suggest that: (i) use of learning strategy does not necessarily bring a higher level of marks; (ii) use of strategies is significant for reducing feelings of isolation, encouraging student

engagement, and improving the willingness of knowledge obtainment; (iii) the strategies which are most significant for positive learning experience include: time management, goal setting, goal checking, planning, starting early, reflecting on existing knowledge and seeking support from colleagues.

5.6 The result of data analysis in this chapter

This chapter firstly analyses the findings of questionnaire survey to evaluate the extent to which students used learning strategies. It provides detailed evidence of the various strategies used in distance learners' experience. In addition, distance learners experience difficulties in a range of areas; findings in this chapter prove the significance of learning strategies in self-direction, self-regulation and cognitive efficiency. Furthermore, students' self-report on the effectiveness of interactions with others are analysed. The effectiveness of learning strategies is also critically analysed through their correlations with the evaluations of distance learning (marks, isolation, distraction, obtained knowledge and engagement). In short, evidence in this chapter has shown that learning strategies are used by the majority of participants in overcoming difficulties in various ways. The use of learning strategies is significant in achieving positive learning experience. As a result of these analyses, the key role of using learning strategies to effective learning which was identified in Chapter Four is proved by the findings of the questionnaire.

Chapter Six - Findings and Analysis of the Questionnaire (Part Two - Potential improvement of metacognitive capability)

6.1 Introduction to this chapter

In considering the aim of pedagogical improvement, the development of students' capability in selecting learning strategies is one emphasis in the design of DE. Therefore, the research objective which guides the analysis in this chapter is 'to evaluate the potential improvements of metacognitive capability'.

To achieve this objective, an evaluation of the needs of improvement is firstly required. Not all distance learners have the ability to learn autonomously (Dzakiria, 2008). Students' demands of knowledge of learning strategy thus need to be analysed, this is based on their self-report and their statement of using learning strategies. In addition, metacognition has five scales as shown in the *Framework of the distance learning experience* introduced above in Table 7. Apart from the consideration on the demands of learning strategy, the role of other factors (awareness, ability, motivation and self-evaluation) in their learning experience needs also to be tested. This can provide the potential for improving metacognitive capability. Furthermore, as emphasized in the concept of *individualism,* differences between learners are a main issue to pedagogical design in DE. The impact of multi-factors on the learning experience also needs to be evaluated. In short, the research objective in this chapter is achieved through:

- evaluating the demands of improving metacognitive capability
- exploring the potential improvement of metacognitive capability
- evaluating the influences of multi- factors on learning capability

6.2 Analysis of demands on improving metacognitive capability

6.2.1 Lack of experience in using cognitive strategies

The findings suggest that knowledge of cognitive efficiency is not effectively applied compared with the awareness of self-direction and self-regulation. Relevant findings show that the

The learning strategies most frequently mentioned by respondents to the survey relate to self-directed and self-regulated strategies. Examples include *note taking* and *note studying in*

reading (29 responses), *wide reading* and *background study* (23 responses) in understanding, *using provided support systems* (13 responses) in seeking support, *learning from everyday practice* (11 responses) in using technology, *seeking human support* (19 responses) in dealing with feedback problems and *wider reading and deep learning* (15 responses) in preparing for assessment and assignments. Cognitive strategies are used less frequently. Thus, *mind mapping* (1 response) in reading, *verbal learning* (1 response) and *self-condition management* (1 response) in understanding, *controlling panic* (1 response) and *managing psychological dynamics* (1 response) in preparing for assessment and assignments. The lack of application of cognitive strategies was evident in the experience of the respondents.

6.2.2 Strategies used for different purposes

Often, the same strategies were used for different purposes. For example, *making notes* can be used as a self-directed strategy in reading and may also be used as a cognitive strategy for achieving deep thinking while preparing for assessment and assignments. *Interactions* can be used for most learning activities based on their demands, and *skimming* can be used in different ways according to learning styles. The details of the findings are interpreted in this section.

Firstly, use of s*kimming* varies in different students' experience. For example, one student explained that focusing on the main point is used at the start of reading and *skimming* the whole paper to understand the whole picture. Another student mentioned that he skimmed the paper first before focusing on particular points. Riding and Rayner (1998) suggest that learners have different cognitive styles and two fundamental dimensions of cognitive style are known as holistic-analytic and verbal imagery style. The difference in the use of the same strategies shows the influences of learning styles.

Planning was used for different considerations. For example, (i) planning what to do in regular learning activities (for example, 'planning what to cover on a week-by-week basis'); (ii) planning for completing tasks (for example, 'prepare a programme for the semester to complete work'); (iii) planning to ensure the quality of work (for example, 'each assignment had to be completed in six weeks; I would aim to have the first draft completed in four. I would then spend two weeks thinking how I can improve on it').

Reflection on work experience to better understand the learning content was described in different ways. The data show that reflecting is an important method in postgraduate students' learning experience (for example, 'I related all my study to my work context, which made it more useful and also made me more motivated'). The use of reflection is specifically highlighted by one student: 'First, I apply the knowledge to real life experience; second, I compare the learning content with practical problems which we face at work; thirdly, I related to previous working experience, and finally I learn from senior colleagues'. Another student

stated, ‘I work in the field that I am also studying in, except that I am junior/newish to the role, and the main strategies I have taken are to try and apply what I am learning to how I work and the work I am involved in and how this is applied in practice’.

Findings from qualitative data reveal of how environment management and time management were adopted as a strategy. *Management of their environment* was used for effective reading and preparing for assessment/assignments. Students replied that they switched off the TV and music equipment to find a quiet environment for reading. *Time management*, on the other hand, was used for effective reading, for example, ‘study at any given spare time, after work and during weekends’, ‘reading whilst travelling to work/meetings etc. greatly helped with keeping up with required reading’ and ‘late nights at weekends, early mornings, and week/working days’. *Time management* was also frequently mentioned as a strategy when preparing for assessment/assignments and students manage their time to study based on their own circumstances. For instance, one student stated that, ‘assignments were set on a monthly basis. I tried to plan the weeks to maximise my time and production. As a rule: Week 1 – Research; Week 2 - Research, first draft; Week 3 - second draft ; Week 4 - final draft’.

6.2.3 Capability in combining multi-strategies

Differences in selecting strategies are also found in the ways in which multi-strategies were combined. Multi-strategies were mostly mentioned in reading learning materials, understanding learning content and preparing for assessment and assignments. The data show that the participants combine multiple strategies for their purpose of effective learning.

6.2.3.1 Combining multi-strategies for effective reading

Firstly, the strategies were combined for systematic reading. One student combined the strategies of note taking, highlighting and seeking guidance in reading learning materials, ‘note taking whilst reading, use of highlighters and recognising references for occasional further reading’. Another three examples are illustrated:

> Example one: ‘Skim read for relevance and then in-depth reading of the most appropriate materials for the task in hand. Also, I download electronic copies in iPhone so that these could be read whilst on the move’.
>
> Example two: ‘I read the assignment/task for the module first to get an understanding of what I need to know by the end of my studies. I skim through the module reading first to get a feel for its content and breadth, etc. I look at the reading list and try and understand the context and the breadth of the material to be absorbed and understood’.
>
> Example three: ‘One: compare it with the subject authority writers' books; two: read both if possible; three: look for alternative view reading; four: construction of related

reading. Thus, it is important that an appropriate reading list and assignment title are provided in a well thought-out manner for effective learning. The University needs to review how to improve the above, especially as each student comes with varied background, but a well thought-out program can help all to excel'

6.2.3.2 Combining multi-strategies for time efficiency

Combinations were used for completing tasks in the given period of time. *Assignment focus*, *time management* and *wide reading* were combined together to complete the reading and achieve the expectations of evaluation in a limited time. One student stated that:

> It is hard to do speed reading especially if it is for learning, but it's effective for assignments. So, it really depends on the purpose of reading. My priorities are: 1. Be aware of the assignment title and scope of reading; 2. Calculate how much time is needed to finish all the course papers; 3. Attempt to draft assignment; 4. More reading (this is the one I find difficult as more help is needed from tutors to find the correct source; even internet sources are a waste of time as there is too much to skim); 5. Do the assignment and submit. I find my time is lost in most cases on Item 4, where I need to be attentive to the assignment, thus the time left to enjoy reading and reflection is not fulfilling at this moment. What I suggest is to consider the appropriate assignment title that can be a work to do and fulfil knowledge/learning as well which kills two birds with one stone.

Another student briefly states multi-strategies in considering the time efficiency and management of self-condition:

> 1. What to do; 2. How much time I have? 3. Spread out the time; 4. Safety net: time out for leisure and technical fault in technology...so that I will not be under necessary stress and imbalanced mood.

6.2.3.3 Combining multi-strategies for multi-demands

Thirdly, multiple strategies were used for multi-demands. For example, *starting early* is a strategy for finishing a task within the expected schedule. *Using dictionaries* is a strategy used by students who are non-native speakers; *wide research* is a strategy used for in-depth learning and critical thinking. *Interaction* is the strategy of seeking support. These strategies mentioned in one student's response show the use of multi-strategies based on their multi-demands. The student's approach was: 'Start early before the due date. Have a good translation tool (English is not my mother tongue) Do further research. Ask peers or senior colleagues'. Another student used multi-strategies similarly, which were described as:

> Choose the right texts to study first. Plan time and locations to read effectively, take study notes to ensure learning is happening. Mark up (use post-it notes, etc.) while reading and discuss what I have read with others (need to do this more often). Try and relate what I am learning with what I already know.

6.2.3.4 Combining multi-strategies for cognitive efficiency

Combinations of the strategies were used, demonstrating cognitive efficiency. For instance, *review* and *reflection* are combined, as one student indicated: 'Repeated reading with context, and relating to real life practical experiences'. *Review* and *memorizing* are also combined. For example: 'when using course notes, I would read them over and over again and try to talk to peers if I did not understand the content'. In addition, *reflection* and *interaction* are combined as illustrated below:

> I personally learn more effectively if I have had real world experience/learning on the job before studying the theory. If I do not have practical experience, I will speak to people who have, to get more anecdotal learning rather than entirely theory-based learning

Furthermore, strategies are combined systematically in preparation for the assessment/assignments. For example, *time management* and *gathering information* is combined: 'gather all materials early through web search and books, and then complete assignment over four days'. In addition, making an *early start*, *developing drafts* and *improving tasks* were combined as follows:

> Read the assignment at the start of the module so you can study with purpose and begin to formulate an answer (or at least realise when part of the answer arrives during the study) as you study. Prepare a first draft, revise it, re-read it, refine it, and submit only when the delivery date is due to give maximum time for thinking, refining and adaptation.

6.2.3.5 Combing multi-strategies to deal with feedback problems

The following relating to use of strategies shows the problem of feedback and self-development in learning experience:

> Early preparation through research to understand the topic - reading materials were never sufficient to understand it so I had to conduct my own. Lots of drafting helped, generally the marks I received reflected how much effort I had time to put into the assignment – regardless, I would often get little feedback justifying the marks received, whether good or bad. It was perplexing and I had very little learning benefit out of assignment feedback, which I think is appalling.

6.2.3.6 Analysis: students' different abilities in using strategies

The findings show that students have different levels of metacognitive capability. In this section these are subjected to analysis using Sharpe and Beetham's model of effective e-learning. The model is a pyramid with its levels being (starting with the lowest) *functional access*, *skills*, *practice* and *creative appropriation* (Sharpe and Beetham, 2010).

As learning strategy mainly exist in students' experience, the level of functional access and skills are analysed as the first level. The findings suggest that the level of functional access, some students do not have any strategies when others provided multi-strategies. Some individuals are aware of the role of the strategy but lack the practice. 'Unfortunately I depended on my own resources too much and should have reached out for the help of others more', one participant claimed. Also, lack of knowledge on the effectiveness of strategy is also apparent in the data. Some students stated that they do not use any strategies in their learning; for example, one student commented: 'unfortunately I am not using any specific strategy and readings are taking more time than what is supposed to take'. In addition, same strategy was used to deal with different situations (see Section 6.2.2), this suggests that existing strategies need to be critically applied into distance learning. Individuals need to select appropriate strategies based on their own situations.

At practice level, students have different levels of abilities in operating strategies to deal with difficulties. The analysis of the role of learning strategies in Section 5.4 shows the details. The uses of different strategies to achieve same purpose present a picture of individual differences. It is important to develop and select appropriate strategies based on students' own circumstances. Students need to be aware of the importance of metacognition in DE and be able to select appropriate learning strategies.

Finally, combinations of multi-strategies are employed by those that have higher level metacognitive capabilities. These students have obvious strengths in comparison with those do not use strategies or those who used single strategies.

6.2.4 Students' needs for learning strategies

6.2.4.1 Data collection and manipulating the data

Firstly, the item used to ask participants' opinions about whether they need more knowledge of relevant strategies include,

- 'I still need to learn how to read faster and more effectively'.
- 'I still need to know how to understand the learning content more effectively'.
- 'I still need to learn how to seek more support for learning'.
- 'I still need training sessions to improve my IT skills'.

The item used to ask students to what extent they needed strategies to deal with the problem of lack of feedback in DE was reversed from 'I developed my own strategies for learning effectively when I could not obtain feedback and/or could not get it in time' to be: 'I didn't develop my strategies……when I could not obtain feedback…'. Similarly, the values to 'I am satisfied with my marks' are reversed to 'I was not satisfied with my marks'.

6.2.4.2 Findings and analysis of students' need for learning strategy

The total value of Agree and Strongly agree for relevant items are gathered to show students' demands for further knowledge of learning strategy. The findings show that a minority of participants require knowledge of IT skills 30.4% and knowing how to seek support. The majority of participants need the knowledge of learning strategies for other learning activities. For instance, 70.8% of participants need learning strategies to read faster and more effectively; 51.0% of them need learning strategies to understand the learning content more effectively; 55.6% need learning strategy to deal with the problems of not getting feedback and 64.9% need learning strategy effectively prepare for evaluation for the expected result. The findings and their calculation are shown in Table 29.

Table 29. Students' self-reports on the needs of learning strategy

Item	Agree	Strongly agree	Total value
I still need to learn how to read faster and more effectively	41.7%	29.1%	70.8%
I still need to know how to understand the learning content more effectively	42.4%	8.6%	51.0%
I still need to learn how to seek more support for learning	38.4%	6.6%	45.0%
I still need training sessions to improve my IT skills	25.8%	4.6%	30.4%
I didn't develop my strategies……when I could not obtain feedback…	47.7%	7.9%	55.6%
I was not satisfied with my marks	56.3%	8.6%	64.9%

6.2.5 Summary of demands for improving metacognitive capability

To sum up the findings, distance learners have different levels of capability in using learning strategies. The majority of students realise their own needs for learning strategies. Improvement of students' metacognitive capability is therefore a factor for students who lack the ability at a higher level and those who do not use strategies. How this can be achieved is

another question. The questionnaire provides further information on students' metacognition, which also point to the need for improvement in metacognitive capability.

6.3 Findings and analysis of student metacognitive experiences

6.3.1 Data collection and analysis

As discussed in Section 4.3.2, metacognition includes learning: awareness, ability, motivation, using strategy and evaluation. Learning activities occur in the students' own environment. Only students themselves can answer that to what extent students are aware of DE delivery, to what extent they face up to the difficulties, to what level they are motivated and to what level they complete expected learning activities. Therefore, closed statements were designed to allow students to self-report their levels of awareness, ability, motivation and effectiveness of learning strategies. Students reported their experience by selecting responses from a five-point Likert scale. This section presents the findings and analyses of possible associations between six learning activities in each scale of metacognition.

6.3.2 Findings of student experience of main components of metacognition

6.3.2.1 The percentage of participants who are aware of distance learning

Student awareness of how DE is delivered and what they are supposed to do is evaluated by using six groups of learning activities, and is calculated as the total value of *Agree* and *Strongly agree*. The percentages of participants who are aware of the design of DE are supposed to do are shown in Table 30.

Table 30. The percentage of participants who are aware of distance learning

Item	Agree	Strongly agree	Total
I knew what I was supposed to read	49%	28.6%	77.6%
I was clear about what I was supposed to learn	67.3%	15.9%	83.2%
I knew what support I could get from the programme	59.9%	17.0%	76.9%
I understood the purpose of using of information technologies in my programme	52.4%	39.5%	91.9%
I did not rely on tutor's comments to evaluate and improve my learning	7.5%	2.7%	10.2%
I understood the assessment/assignment questions	64.6%	10.9%	75.3%

The results in Table 30 show that 77.6% of participants believe they are aware of what should be read, 83.2% are aware of what should be learnt, 76.9% are aware of the provided support, 91.9% are aware of the applied technology and 75.3% are aware of the questions for evaluation. Evidently, only 10.2% of participants are aware of the problems of feedback in DE. These statistics suggest that the majority of participants believe that they are aware of the way DE is design and delivered and what they are supposed to do. However, a lack of awareness on the issue of the absence of feedback which is produced by the characteristics of DE is clearly shown in the findings. Analyse the level of difficulties students experienced, the positively worded items are reversed to make them negatively worded. For example, 'I got support when I communicated my learning needs to the relevant staff' is reversed to 'I did not get support when I communicated my learning needs to the relevant staff'.

6.3.2.2 The percentages of participants who experienced difficulties in distance learning

As already described, the total value of *Agree* and *Strongly agree* are calculated to analyse the percentage of students who experienced difficulties in the six groups of learning activities. These are shown in Table 31.

Table 31. The percentages of participants who experienced difficulties in distance learning

Item	Agree	Strongly agree	Total
It was difficult for me to finish the amount of reading materials	43.0%	29.1%	72.1%
It was difficult for me to understand learning content on my own	27.2%	4.6%	31.8%
I did not get support when I communicated my learning needs to the relevant staff	7.9%	2.0%	9.9%
It was difficult for me to use technologies provided y the distance learning programme	6.6%	5.3%	11.9%
The feedback I obtained was not what I expected	23.8%	6.6%	30.4%
In general, I found the assessments/assignments difficult	48.3%	6.6%	54.9%

The results in table above indicate that the majority of participants experienced difficulties in completing reading, obtaining expected feedback and preparing for evaluation. Relevant findings include: 72.1% of participants experienced difficulties in competing reading the materials, 31.8% experienced difficulty in understanding the learning content, 9.9% did not receive their expected support, 11.9% experienced difficulty in using technology, 30.4% did

not get expected feedback, and lastly 54.9% of participants felt that the assessments and assignments were difficult.

6.3.2.3 The percentage of participants who are less motivated

Students' levels of motivation in the six groups of learning activities were assessed from the participants' responses. The items designed to test the level of motivation in each group of learning activities and total value of *Agree* and *Strongly agree* are shown in Table 32.

Table 32. The percentage of participants who are less motivated

Item	Agree	Strongly agree	Total
I was fully motivated to do the reading	38.4%	9.3%	47.7%
I was fully motivated to work on understanding learning content	58.3%	14.6%	72.9%
I was motivated to communicate with staff when I needed support	48.3%	20.5%	69.3%
I was fully motivated to use technologies for better study	53.0%	31.8%	84.8%
I could maintain motivation even if I did not get feedback and comments	43.0%	4.6%	47.6%
I was fully motivated to work for the assessments/assignments	55.0%	23.8%	78.8%

The findings show that the majority of participants report they were motivated in understanding the learning content, in seeking support from relevant staff, in using technology and in working for the evaluations. Less than half of the participants were motivated in reading and studying when they 'did not get feedback and comments'.

6.3.2.4 The percentage of participants who need to improve their learning

Learning effectiveness in each learning activity was self-reported by the students. The total values for learning effectiveness are calculated as the sum of Agree and Strongly agree. The percentages of the participants who believe that they achieved what they needed to do are shown in Table 33.

Table 33. The percentage of participants who need to improve their learning

Items	Agree	Strongly agree	Total
I completed what I was supposed to read	51.7%	10.6%	62.3

I understood the learning content which I was supposed to learn after completion of the subject	62.9%	13.2%	76.1%
I solved problems in learning by seeking support	55.6%	15.2%	70.8%
The use of technology was significant for my learning efficiency	48.3%	24.5%	72.8%
The feedback I obtained was what I expected	39.1%	4.6%	43.7%
I was satisfied with my marks	56.3	8.6	64.9%

The data show that most participants reported that they achieved the expected objectives. The lowest value of effectiveness is obtained feedback (43.7%). This again shows the problem of feedback in DE.

6.3.2.5 Summary of the findings

To further understand the dynamics of metacognition in learning process, correlation analysis was carried out to evaluate the relationships between metacognition and positive learning experience, and the relationships between vertical and horizontal factors in the framework of the distance learning experience. Details are shown in the following sections.

6.3.3 Analysing the relationship between factors of metacognition and factors of positive learning experience

To explore the potential for improvement in students' metacognitive capability, the effectiveness of each factor of metacognition on positive experience in DE was then evaluated. The results permit analysis of whether students' capability needs to be improved in the relevant factors of learning strategy. Spearman's rho (ρ), as explained in Section 5.5.2.1, was the statistical device used to measure association.

6.3.3.1 Relationships between students' awareness and overall experience

Spearman's rho is used to evaluate the correlations between awareness in each main learning activity and factors of effective experience (average marks, knowledge obtainment, isolation, distraction, and engagement). The statistical details of these associations are shown in Table 34.

Table 34. Correlations between students' awareness and overall experience (Spearman's rho)

		Awareness of reading task	Awareness of learning content	Awareness of support	Awareness of technology	Awareness of feedback problems	Awareness of evaluation questions
Average marks	Correlation Coefficient	**.226****	.069	.123	.085	-.083	.034
	Sig. (2-tailed)	.005	.403	.132	.298	.310	.681
	N	151	151	151	151	151	151

Self-evaluation of obtained knowledge	Correlation Coefficient	**-.336****	-.199*	**-.262****	-.209*	.184*	-.137
	Sig. (2-tailed)	.000	.014	.001	.010	.024	.093
	N	151	151	151	151	151	151
Isolation	Correlation Coefficient	-.156	**-.248****	**-.346****	-.105	.029	-.164*
	Sig. (2-tailed)	.055	.002	.000	.198	.723	.044
	N	151	151	151	151	151	151
Distraction	Correlation Coefficient	.031	-.015	-.086	-.096	.004	-.043
	Sig. (2-tailed)	.707	.851	.294	.239	.965	.601
	N	151	151	151	151	151	151
Minimum hours (engagement)	Correlation Coefficient	.050	.044	.149	.076	-.160	-.034
	Sig. (2-tailed)	.545	.591	.068	.355	.050	.676
	N	151	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Within the outputs of statistical analysis (Table 34), there are significant associations that suggest that students who are *aware of what they are supposed to be reading* are more likely to have *high marks* (ρ=.226, p=.005), and not be satisfied with their experience of *obtained knowledge* (ρ=.-336, p=.000). Students who said that they understood the necessary 'learning content' …'after completion of the subject' were less likely to have been those who felt isolated (ρ=-.248, p=.002). Students who are aware of *learning support* are less satisfied with *obtained knowledge* (ρ=-.262, p=.001) and less *isolated* (ρ=-.346, p=.000).

6.3.3.2 Relationships between difficult experience and positive learning experience

Having a *difficult experience* was tested for association between with the factors in evaluating learning effectiveness. The details of the statistical analysis are shown in Table 35.

Table 35. The influences of difficulties on positive learning experience (Spearman's rho)

		Difficulties in reading	Difficulties in understanding learning content	Difficulties in getting support	Difficulties in using technology	Difficulties in getting expected feedback	Difficulties in preparing for evaluation
Average marks	Correlation Coefficient	-.022	-.167*	.074	-.149	.022	-.130
	Sig. (2-tailed)	.785	.041	.369	.068	.784	.113
	N	151	151	151	151	151	151
Self-evaluation of obtained knowledge	Correlation Coefficient	.094	.189*	.156	.174*	.107	-.049
	Sig. (2-tailed)	.249	.020	.056	.033	.193	.553
	N	151	151	151	151	151	151
Isolation	Correlation Coefficient	.113	**.238****	.148	**.233****	.111	.060
	Sig. (2-tailed)	.168	.003	.069	.004	.173	.467
	N	151	151	151	151	151	151

Distraction	Correlation Coefficient	.065	.166*	.041	.042	.081	.044
	Sig. (2-tailed)	.430	.041	.614	.609	.325	.590
	N	151	151	151	151	151	151
Minimum hours	Correlation Coefficient	.150	-.015	.033	-.134	-.008	.084
	Sig. (2-tailed)	.065	.857	.688	.101	.925	.307
	N	151	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The results of statistical analysis (Table 35) suggest that difficult experiences are not significantly correlated with *average mark*, *obtained knowledge* or *student engagement*. However, significant associations were found with *feelings of isolation*. The findings show that *isolation* is significantly associated with *difficulties in understanding learning content* (ρ=.238, p=.003) and *difficulties in using technology* (ρ=.233, p=.004). This suggests that students who feel they have difficulty in understanding learning content and using technology are more likely to feel isolated.

6.3.3.3 Relationship between motivation and positive learning experience

The relationships between level of motivation in six groups of learning activities and factors of learning effectiveness are evaluated. The outputs of correlation analysis are shown in the following table.

Table 36. Correlations of motivation with learning experience (Spearman's rho)

		Motivation in reading	Motivation in understanding learning content	Motivation in seeking support	Motivation in using technology	Motivation in working with lack of feedback	Motivation in preparing for evaluation
Average marks	Correlation Coefficient	.176*	.209*	.033	.141	.031	.123
	Sig. (2-tailed)	.031	.010	.683	.085	.707	.132
	N	151	151	151	151	151	151
Self-evaluation of obtained knowledge	Correlation Coefficient	**-.359****	**-.326****	-.134	**-.216****	-.141	**-.296****
	Sig. (2-tailed)	.000	.000	.100	.008	.084	.000
	N	151	151	151	151	151	151
Isolation	Correlation Coefficient	**-.260****	-.188*	**-.231****	-.204*	**-.223****	-.135
	Sig. (2-tailed)	.001	.021	.004	.012	.006	.099
	N	151	151	151	151	151	151
Distraction	Correlation Coefficient	**-.286****	**-.290****	-.124	-.028	-.132	-.189*
	Sig. (2-tailed)	.000	.000	.128	.730	.107	.020
	N	151	151	151	151	151	151

Minimum hours	Correlation Coefficient	**.295****	**.246****	-.012	.071	.063	**.215****
	Sig. (2-tailed)	.000	.002	.880	.387	.442	.008
	N	151	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The results (see Table 36) show that: (i) No correlation with *average mark* is significant at .01 level. (ii) Student *self-evaluation on obtained knowledge* is significantly negatively correlated with *motivation in reading materials* (ρ=-.359, p=.000), *motivation in understanding learning content* (ρ=-.326, p=.000), *motivation in using technology* (ρ=-.216, p=.008) and *motivation in preparing assessments and assignments* (ρ=-.296, p=.000). (iii) *Feelings of isolation* are significantly negatively correlated with *motivation in reading materials* (ρ=-.260, p=.001), *motivation in seeking support* (ρ=-.231, p=.004) and *motivation when working with lack of feedback problems* (ρ=-.223, p=.006). (iv) *Feelings of distraction* are significantly negatively correlated with *motivation in reading materials* (ρ=-.286, p=.000) and *motivation in understanding learning content* (ρ=-.290, p=.000). (v) *Student engagement* is significantly correlated with *motivation in reading materials* (ρ=.295, p=.000), *motivation in understanding learning content* (ρ=.246, p=.002), and *motivation in preparing for evaluation* (ρ=.215, p=.008).

6.3.3.4 Relationships between achievement in each activity and overall experience

Students' self-evaluation of their own achievement in each learning activity was the evaluation of the effectiveness of using strategies. How their achievement in each group of learning activity correlated with the factors of effective learning experience were tested. The details of the outputs of correlation analysis are shown in Table 37.

Table 37. Correlations between achievements and overall experience

		Completed reading	Understanding learning content	Sought support	Effective technology	Obtained expected feedback	Obtained expected mark
Average marks	Correlation Coefficient	.157	.112	-.088	.004	.050	**.228****
	Sig. (2-tailed)	.054	.173	.281	.963	.542	.005
	N	151	151	151	151	151	151
Self-evaluation of obtained knowledge	Correlation Coefficient	**-.286****	**-.213****	-.004	-.207*	-.097	**-.316****
	Sig. (2-tailed)	.000	.009	.964	.011	.236	.000
	N	151	151	151	151	151	151
Isolation	Correlation Coefficient	-.165*	-.068	-.009	-.152	-.080	.008
	Sig. (2-tailed)	.043	.408	.910	.063	.327	.923
	N	151	151	151	151	151	151

Distraction	Correlation Coefficient	-.154	-.052	.059	.065	-.078	.064
	Sig. (2-tailed)	.059	.523	.468	.427	.344	.434
	N	151	151	151	151	151	151
Minimum hours	Correlation Coefficient	.134	.111	.018	.107	-.100	-.071
	Sig. (2-tailed)	.100	.176	.829	.190	.223	.388
	N	151	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The outputs of the statistical analysis (Table 37) show that, student self-reports of their *satisfaction with the knowledge they had obtained* was significantly **but negatively,** correlated with *completion of reading* (ρ=-.286, p=.000), *understanding learning content* (ρ=-.213, p=.009), and *satisfaction with marks* (ρ=-.316, p=.000) suggesting that students who complete the expected reading, understand learning content and are satisfied with their marks are less likely to be satisfied with the level of knowledge they have obtained. At face value, this may seem counter-intuitive. However, the probable interpretation is that students expect more knowledge from distance learning when they progress well on expected tasks. The statistical analysis also shows that *average mark* levels significantly correlate with *student satisfaction* (ρ=.228, p=.005): this relationship is not unexpected, however it may question the validity of over-reliance on the concept of 'student satisfaction' as a **sole** basis for developing DE

6.3.3.5 Summary of the findings

In summary, each scale of metacognition is significantly correlated with effective learning. The statistics suggest that:

i. The level of students' awareness of reading tasks, main points of learning content and available support have significant influences on positive learning experience, with regard to level of marks, obtained knowledge, feelings of isolation.
ii. Students who have feel difficulty in understanding learning content and using technology are more likely to feel isolated.
iii. Students who are motivated in distance learning are less likely to feel isolated and distracted. They are more dissatisfied with their obtained knowledge and are more likely to engage in their learning.
iv. The correlations between students' achievements in each learning activity and factors of learning success are shown in Table 40. The results suggest that student achievement in each learning activity is not correlated with their feelings of isolation, feelings of distraction and students engagement. In addition, the unreliability of student satisfaction in predicting student demands is suggested by the statistics.

The results in this section suggest that improvement of overall metacognitive capability is significant for positive learning experience. This suggests the need for further exploration of what should be the focus of this improvement. An evaluation of the potential improvement of metacognitive capability is carried out through analysing the findings within each dimension of the framework of the distance learning environment in the following sections.

6.3.4 Vertical analysis: dynamics of metacognitive factors in learning process

6.3.4.1 Introduction of statistical analysis

This section includes the analysis of the dynamics of each metacognitive factor in six main activities of distance learning. This aims to find the main factors which would be emphasized in design of the pedagogy. The correlations are analysed between students' experience of one factor of metacognition in each of the learning activities, i.e., the findings of students experience in relation to the vertical factors in the framework of distance learning experience. This is shown in Table 38.

Table 38. Analysing the relationships between vertical factors

	Awareness	Difficulties	Motivation	Effectiveness	
Reading materials	↓	↓	↓	↓	Relevant factors: marks, engagement, locus of control, perspectives and satisfaction, knowledge development
Understanding learning content	↓	↓	↓	↓	
Seeking learning support	↓	↓	↓	↓	
Using technology	↓	↓	↓	↓	
Dealing with feedback problems	↓	↓	↓	↓	
Preparing for evaluations	↓	↓	↓	↓	
Background information	Age, gender, origin of student, language status, domestic responsibility, experience in DE, cultural influences,				

The correlation analysis of four factors of metacognition is carried out one by one (with the exception being learning strategy, which has been analysed in Chapter Five). Results of the analysis are interpreted in the following sections.

6.3.4.2 Correlations between student awareness in six learning activities

The correlation analysis is carried out to understand the relationships between student awareness in each group of learning activities. Details of the correlation analysis are shown in Table 39.

Table 39. Correlations between student awareness in six learning activities

		Awareness of reading	Awareness of cognition	Awareness of available support	Awareness of using technology	Awareness of feedback problems	Awareness of assessment
Awareness of reading	Correlation Coefficient	1.000	**.493****	**.268****	.183*	-.052	.200*
	Sig. (2-tailed)	.	.000	.001	.024	.524	.014
	N	151	151	151	151	151	151
Awareness of cognition	Correlation Coefficient	.493**	1.000	**.413****	**.309****	-.092	**.331****
	Sig. (2-tailed)	.000	.	.000	.000	.263	.000
	N	151	151	151	151	151	151
Awareness of available support	Correlation Coefficient	.268**	.413**	1.000	**.334****	-.175*	**.317****
	Sig. (2-tailed)	.001	.000	.	.000	.031	.000
	N	151	151	151	151	151	151
Awareness of using technology	Correlation Coefficient	.183*	.309**	.334**	1.000	**-.241****	.139
	Sig. (2-tailed)	.024	.000	.000	.	.003	.090
	N	151	151	151	151	151	151
Awareness of feedback problems	Correlation Coefficient	-.052	-.092	-.175*	-.241**	1.000	-.023
	Sig. (2-tailed)	.524	.263	.031	.003	.	.775
	N	151	151	151	151	151	151
Awareness of evaluation	Correlation Coefficient	.200*	.331**	.317**	.139	-.023	1.000
	Sig. (2-tailed)	.014	.000	.000	.090	.775	.
	N	151	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The outputs in Table 39 show that most correlations between every two categories of student awareness in reading, cognition, seeking support, using technology and preparing for evaluations are significant at 0.01 levels. However, there are weaker and generally insignificant correlations between *awareness of feedback problems* with other factors, except

for *awareness of using technology*. These findings suggest that the students who are aware of *any* of their required learning activities (e.g. *I knew what I was supposed to read*) were generally aware of *all of them.* However, the problem of feedback appears as a special issue.

6.3.4.3 Correlations between difficulties and overall experience

The correlations between students' experiences of difficulties in each group of their main learning activities are evaluated. The outputs of correlation analysis are shown in Table 40.

Table 40. Correlations between difficulties and overall experience (Spearman rho)

		Difficulties in reading	Difficulties in understanding learning content	Difficulties in getting support	Difficulties in using technology	Difficulties in getting expected feedback	Difficulties in preparing for evaluation
Difficulties in reading	Correlation Coefficient	1.000	**.216****	.101	.054	.141	.187*
	Sig. (2-tailed)	.	.008	.218	.511	.084	.022
	N	151	151	151	151	151	151
Difficulties in understanding learning content	Correlation Coefficient	.216**	1.000	.039	**.261****	.121	.191*
	Sig. (2-tailed)	.008	.	.633	.001	.139	.019
	N	151	151	151	151	151	151
Difficulties in getting support	Correlation Coefficient	.101	.039	1.000	**.230****	**.321****	-.032
	Sig. (2-tailed)	.218	.633	.	.004	.000	.693
	N	151	151	151	151	151	151
Difficulties in using technology	Correlation Coefficient	.054	.261**	.230**	1.000	.143	-.029
	Sig. (2-tailed)	.511	.001	.004	.	.081	.726
	N	151	151	151	151	151	151
Difficulties in getting expected feedback	Correlation Coefficient	.141	.121	.321**	.143	1.000	.005
	Sig. (2-tailed)	.084	.139	.000	.081	.	.952
	N	151	151	151	151	151	151
Difficulties in preparing for evaluation	Correlation Coefficient	.187*	.191*	-.032	-.029	.005	1.000
	Sig. (2-tailed)	.022	.019	.693	.726	.952	.
	N	151	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The results (Table 40) include several significant correlations. The correlation between the difficulty in reading and difficulty in cognition is significant at .01 level (ρ=.216, p=.008). The correlation between *difficulty in cognition* and *using technology* is significant at 0.01 level (ρ=.261, p=.001). *Difficulty in seeking support* is significantly correlated with the *difficulty in using technology* (ρ=. 230, p=.004) and *difficulty in achieving feedback* (ρ=.321, p=.000). To interpret the statistical outputs, students who experience difficulties in reading are more likely

to experience cognitive difficulties. Students who find difficulty in understanding the learning content are more likely to have technology problems. Students who experience difficulty in seeking support are more likely to experience difficulty in using technology and obtaining expected feedback. On analysis, reducing students' experience of difficulties in cognition, technology, seeking support and solving feedback problems has a significant influence on reducing difficulties in other learning experience.

6.3.4.4 Correlations of motivation in each learning activities

To appropriately understand how students maintain motivation in distance learning, the correlations between motivations in each activity of learning are tested as shown in Table 41.

Table 41. Correlations of motivation in each learning activities (Spearman rho)

		Motivation in reading	Motivation in understanding learning content	Motivation in seeking support	Motivation in using technology	Motivation in working without feedback	Motivation in preparing for evaluation
Motivation in reading	Correlation Coefficient	1.000	**.484****	.144	.126	.111	**.350****
	Sig. (2-tailed)	.	.000	.077	.124	.175	.000
	N	151	151	151	151	151	151
Motivation in understanding learning content	Correlation Coefficient	.484**	1.000	**.224****	**.251****	.023	**.331****
	Sig. (2-tailed)	.000	.	.006	.002	.778	.000
	N	151	151	151	151	151	151
Motivation in seeking support	Correlation Coefficient	.144	.224**	1.000	**.263****	.029	.206*
	Sig. (2-tailed)	.077	.006	.	.001	.725	.011
	N	151	151	151	151	151	151
Motivation in using technology	Correlation Coefficient	.126	.251**	.263**	1.000	.042	.095
	Sig. (2-tailed)	.124	.002	.001	.	.612	.245
	N	151	151	151	151	151	151
Motivation in working without feedback	Correlation Coefficient	.111	.023	.029	.042	1.000	-.010
	Sig. (2-tailed)	.175	.778	.725	.612	.	.903
	N	151	151	151	151	151	151
Motivation in preparing for evaluation	Correlation Coefficient	.350**	.331**	.206*	.095	-.010	1.000
	Sig. (2-tailed)	.000	.000	.011	.245	.903	.
	N	151	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The results of correlation analysis (Table 41) reveals: (i) *Motivation in reading* is significantly correlated with *motivation in understanding learning content* (ρ=.484, p=.000) and *motivation in preparing assessment* (ρ=.350, p=.000). These motivations are associated with intrinsic

motivation. The statistical analysis indicates that students who are intrinsically motivated are more likely to maintain their motivation in cognitive activities. (ii) *Maintaining motivation in understanding the learning content* is significantly correlated with the *motivation in seeking support* (ρ=.224, p=.006), *motivation in using technology* (ρ=.251, p=.002) and *motivation in preparing for evaluation* (ρ=.331, p=.000). This means that students who are motivated to understand the content are more likely to seek support, use technology and prepare for evaluation. (iii) *Motivation in seeking support* is significantly correlated with *motivation in using technology* (ρ=.263, p=.001). (iv) The level of motivation in dealing with feedback problems is not significantly correlated with any other variable. This strongly suggests the issue of feedback problems, which needs to be further explored.

6.3.4.5 Correlations between student achievements in six learning activities

The correlations between the achievements in each learning activity are tested. The outputs of Spearman rho are shown in Table 42.

Table 42. Correlations between student achievements in six learning activities (Spearman rho)

		Completed reading	Understanding learning content	Sought support	Effective technology	Obtained expected feedback	Obtained expected mark
Completed reading	Correlation Coefficient	1.000	**.221****	.097	.042	.082	.121
	Sig. (2-tailed)	.	.006	.237	.612	.319	.138
	N	151	151	151	151	151	151
Understanding learning content	Correlation Coefficient	.221**	1.000	.033	.038	.106	.104
	Sig. (2-tailed)	.006	.	.690	.645	.196	.206
	N	151	151	151	151	151	151
Sought support	Correlation Coefficient	.097	.033	1.000	.155	-.155	.089
	Sig. (2-tailed)	.237	.690	.	.057	.058	.277
	N	151	151	151	151	151	151
Effective technology	Correlation Coefficient	.042	.038	.155	1.000	.125	.014
	Sig. (2-tailed)	.612	.645	.057	.	.127	.866
	N	151	151	151	151	151	151
Obtained expected feedback	Correlation Coefficient	.082	.106	-.155	.125	1.000	.187*
	Sig. (2-tailed)	.319	.196	.058	.127	.	.021
	N	151	151	151	151	151	151
Obtained expected mark	Correlation Coefficient	.121	.104	.089	.014	.187*	1.000
	Sig. (2-tailed)	.138	.206	.277	.866	.021	.
	N	151	151	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The results (see Table 42) show that *completion of reading* is significantly correlated with *understanding the learning content* (ρ=.221, p=.006). There is no other significant correlation. The outputs of statistical analysis show that students who complete their reading are more likely to understand the learning content (see Table 42).

6.3.4.6 Summary of the findings

In summary, the outputs of correlation analysis suggest the following:

i. Levels of awareness in each activity of learning are mostly correlated apart from awareness of feedback problems. This means that students who are aware of DE delivery have the overall knowledge of main learning activities. However, feedback problems need to be considered separately.
ii. Students who have difficulties in one activity are more like to have difficulties in other learning activities. Learning support in producing relevant learning strategies is significant to reduce these difficulties. In addition, higher learning ability is another solution to experiencing difficulty.
iii. Motivation is dynamic and varies over time. What is important is that distance learning on a postgraduate degree course is a long-term activity. During this period, the dynamics at the level of motivation are influenced by both visible and invisible factors in the distance learning environment.
iv. Students' engagement in reading the learning material positively impacts on their understanding of learning content. Maintaining motivation in reading and effective engagement in reading learning materials are therefore suggested to distance learners.

6.3.5 Horizontal analysis: correlations between scales of metacognition

6.3.5.1 Introduction of statistical analysis

To explore the main issues in improvement of metacognitive capability, relationships are analysed between the factors of metacognition, i.e., student awareness, difficult experience, motivation and learning effectiveness. Non-parametric correlations are carried out across the horizontal factors in the *Framework of Distance Learning Experience* (see Table 43) within each group of learning activities. The results of statistical analysis are interpreted in the following sections.

Table 43. Analysis of the relationship between horizontal factors in the framework of distance learning experience

	Awareness	Difficulties	Motivation	Effectiveness	
Reading materials					Relevant factors: marks, engagement, locus of control, perspectives and satisfaction, knowledge development
Understanding learning content					
Seeking learning support					
Using technology					
Dealing with feedback problems					
Preparing for evaluations					
Background information	Age, gender, origin of student, language status, domestic responsibility, experience in DE, cultural influences,				

6.3.5.2 Correlations between factors of metacognition when reading materials

The correlations between four components of metacognitive experience whilst reading learning materials are firstly examined. The relevant statistical output, with associations measured using Spearman's rho (ρ), is shown in Table 44.

Table 44. Correlations between factors of metacognition when reading materials (Spearman rho)

Reading learning material		Reading learning material			
		Awareness	Difficulties	Motivation	Effectiveness
Awareness	Correlation Coefficient	1.000	-.191*	**.220****	**.289****
	Sig. (2-tailed)	.	.019	.007	.000
	N	151	151	151	151
Difficulties	Correlation Coefficient	-.191*	1.000	-.116	**-.345****
	Sig. (2-tailed)	.019	.	.155	.000
	N	151	151	151	151
Motivation	Correlation Coefficient	.220**	-.116	1.000	**.250****
	Sig. (2-tailed)	.007	.155	.	.002
	N	151	151	151	151
Effectiveness	Correlation Coefficient	.289**	-.345**	.250**	1.000
	Sig. (2-tailed)	.000	.000	.002	.
	N	151	151	151	151

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

The results (see Table 44) show that the *level of awareness* of reading materials is significantly correlated with learning *effectiveness* (ρ=.289, p=.000) and *motivation* (ρ=.220, p=.007). This indicates that students who are aware of what should be read are more motivated to, and likely to complete the expected reading tasks. In addition, the *level of difficulty* is significantly negatively correlated with *learning effectiveness* (ρ=-.345, p=.000). Completion of the reading materials is also significantly correlated with *motivation* (ρ=.250, p=.002). To interpret these statistics, students who feel reading is difficult are less likely to complete the reading task. Those who are more motivated, tend to complete it.

6.3.5.3 Correlation between factors of metacognition when understanding the content

In order to understand student experience of cognition, students' awareness, difficulty, motivation and effectiveness in understanding learning content were investigated. Correlations between those values are evaluated and the results are shown in Table 45.

Table 45. Correlation between factors of metacognition when understanding the content (Spearman rho)

Understanding learning content		Understanding learning content			
		Awareness	Difficulties	Motivation	Effectiveness
Awareness	Correlation Coefficient	1.000	**-.295****	**.309****	.168*
	Sig. (2-tailed)	.	.000	.000	.039
	N	151	151	151	151
Difficulties	Correlation Coefficient	-.295**	1.000	-.205*	**-.297****
	Sig. (2-tailed)	.000	.	.012	.000
	N	151	151	151	151
Motivation	Correlation Coefficient	.309**	-.205*	1.000	.128
	Sig. (2-tailed)	.000	.012	.	.117
	N	151	151	151	151
Effectiveness	Correlation Coefficient	.168*	-.297**	.128	1.000
	Sig. (2-tailed)	.039	.000	.117	.
	N	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The results of the correlations between four components of metacognition (see Table 45) show that *awareness of learning content* is significantly negatively correlated with *difficulties in understanding* (ρ=-.295, p=.000) and significantly positively correlated with *motivation* (ρ=.309, p=.000), in other words students who are aware of what *should* be understood are less likely to experience difficulties and more likely to be motivated. In addition, *level of difficulty* is significantly negatively correlated with *motivation* (ρ=-.205, p=.012) and *self-evaluation* (ρ=-.297, p=.000). This indicates that students who are experiencing difficulties in understanding learning content are less motivated and perform less effectively.

6.3.5.4 Correlations between factors of metacognition when seeking support

With regard to *seeking learning support*, the relationships between student experience of awareness, difficulty, motivation and effectiveness were evaluated. The outputs of the statistical analysis are shown in Table 46.

Table 46. Correlations between experiences of seeking support (Spearman rho)

Seeking learning support		Seeking learning support			
		Awareness	Difficulties	Motivation	Effectiveness
Awareness	Correlation Coefficient	1.000	**-.413****	**.344****	**.215****
	Sig. (2-tailed)	.	.000	.000	.008
	N	151	151	151	151
Difficulties	Correlation Coefficient	-.413**	1.000	**-.510****	-.135
	Sig. (2-tailed)	.000	.	.000	.099
	N	151	151	151	151
Motivation	Correlation Coefficient	.344**	-.510**	1.000	**.263****
	Sig. (2-tailed)	.000	.000	.	.001
	N	151	151	151	151
Effectiveness	Correlation Coefficient	.215**	-.135	.263**	1.000
	Sig. (2-tailed)	.008	.099	.001	.
	N	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 46, there were moderately strong significant negative correlations between *awareness of available learning support* and *difficulties in obtaining support* (ρ=-.413, p=.000), and a moderate and significant correlation between *awareness of available learning support* and its *effectiveness* (ρ=.215, p=.008) and *motivation* (ρ=.344, p=.000). These findings suggest that students who are aware of the support provided are less likely to experience difficulties in obtaining the expected support, more likely to be motivated, which in turn they are likely to find effective. In addition, students who experience *difficulties* in seeking support are less likely to be *motivated* (ρ=-.510, p=.000), and students who are *motivated* are more likely to be *effective in obtaining the feedback* which they expect (ρ=.263, p=.001). The association with *motivation* could, of course, be a two-way relationship.

6.3.5.5 Correlations between factors of metacognition when using technology

Correlation analysis was carried out to evaluate the relationships between metacognitive experiences of learning when using technologies. The results of statistical analysis are shown in Table 47.

Table 47. Correlations between factors of metacognition when using technology (Spearman rho)

Using technology		Using technology			
		Awareness	Difficulties	Motivation	Effectiveness
Awareness	Correlation Coefficient	1.000	**-.493****	**.409****	**.378****
	Sig. (2-tailed)	.	.000	.000	.000
	N	151	151	151	151

Difficulties	Correlation Coefficient	-.493**	1.000	**-.460****	**-.448****
	Sig. (2-tailed)	.000	.	.000	.000
	N	151	151	151	151
Motivation	Correlation Coefficient	.409**	-.460**	1.000	**.485****
	Sig. (2-tailed)	.000	.000	.	.000
	N	151	151	151	151
Effectiveness	Correlation Coefficient	.378**	-.448**	.485**	1.000
	Sig. (2-tailed)	.000	.000	.000	.
	N	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

The outputs of statistical analysis (Table 47) suggest that students who are *aware of the role of applied technologies* are less likely to *experience difficulties* (ρ=-.493, p=.000), and more likely to be *motivated* (ρ=.409, p=.000), and to *effectively learn* (ρ=.378, p=.000). In addition, *difficulties* in this area are significantly negatively correlated with *motivation* (ρ=-.460, p=.000) and *learning effectiveness* (ρ=-.448, p=.000). The learning *effectiveness* is also correlated with *motivation* (ρ=.485, p=.000). This suggests that students who experience more difficulties in using technologies are less motivated and perform less effectively; students who are motivated are more likely to be effective when using technology. The results thus highlighting the importance of knowledge of technology in the distance learning experience.

6.3.5.6 Correlations between factors of metacognition when dealing with feedback problems

Relationships between four components of metacognition within student experience of dealing with feedback problems are tested through Spearman rho. The outputs of the statistical analysis are shown in Table 48.

Table 48. Correlations between factors of metacognition when dealing with feedback problems (Spearman rho)

Dealing with feedback problems		Dealing with feedback problems			
		Awareness	Difficulties	Motivation	Effectiveness
Awareness	Correlation Coefficient	1.000	.086	**.189***	-.069
	Sig. (2-tailed)	.	.292	.020	.397
	N	151	151	151	151
Difficulties	Correlation Coefficient	.086	1.000	-.057	**-.284****
	Sig. (2-tailed)	.292	.	.484	.000
	N	151	151	151	151
Motivation evaluations	Correlation Coefficient	.189*	-.057	1.000	-.041
	Sig. (2-tailed)	.020	.484	.	.613
	N	151	151	151	151
Effectiveness	Correlation Coefficient	-.069	-.284**	-.041	1.000
	Sig. (2-tailed)	.397	.000	.613	.
	N	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

The outputs of statistical analysis (Table 48) show that there are fewer significant correlations between the five scales of learning when dealing with *feedback problems*. The only significant

correlation is at .05 level between *awareness* and *motivation* (ρ=.189, p=.020). This relatively weak correlation could be interpreted as showing that students are slightly more likely to maintain their motivation if they are aware of feedback problems (as opposed to them not being aware). In addition, *obtaining feedback* is significantly correlated with *feedback satisfaction* (ρ=.284, p=.000) suggesting that students who obtain feedback are likely to be satisfied with it.

6.3.5.7 Correlations between factors of metacognition when preparing for evaluation

The correlations between each component of metacognitive capability when preparing the evaluations are tested and the statistics in Table 49 show the results of correlations analysis.

Table 49. Correlations between factors of metacognition when preparing for evaluation

Preparing for assessments/assignments		Preparing for assessments/assignments			
		Awareness	Difficulties	Motivation	Effectiveness
Awareness	Correlation Coefficient	1.000	-.120	**.278****	**.283****
	Sig. (2-tailed)	.	.142	.001	.000
	N	151	151	151	151
Difficulties	Correlation Coefficient	-.120	1.000	.005	.027
	Sig. (2-tailed)	.142	.	.956	.739
	N	151	151	151	151
Motivation evaluations	Correlation Coefficient	.278**	.005	1.000	**.305****
	Sig. (2-tailed)	.001	.956	.	.000
	N	151	151	151	151
Effectiveness	Correlation Coefficient	.283**	.027	.305**	1.000
	Sig. (2-tailed)	.000	.739	.000	.
	N	151	151	151	151

**. Correlation is significant at the 0.01 level (2-tailed).

Results in Table 49 show that *awareness* is significantly correlated with *motivation* (ρ=.278, p=.001) and *satisfaction with marks* (ρ=.283, p=.000). This suggests that students who are aware of the questions are more likely to be motivated and satisfied with their marks. In addition, *motivation* is significantly correlated with students' *satisfaction* with their marks (ρ=.305, p=.000). This indicates that students who are motivated to work in order to prepare the evaluation are more likely to be satisfied with their expected marks

6.3.5.8 Summary of the findings

In summary, the results suggest that improvements in metacognitive capability need to be addressed in the development of student awareness and learning ability. Firstly, the significant correlations with students' awareness of DE delivery in all six groups of main learning activities suggest that the level of awareness on DE impacts on positive learning experience in terms of using strategy and maintaining motivation. In other words, improving students' awareness of DE delivery is one way to improve metacognitive capability. Secondly, difficulty in the experience shows significant negative correlations with learning effectiveness

in most learning activities, such as *reading material*, *understanding learning content*, *seeking support*, *using technology* and *dealing with feedback problems*. Therefore, improving student learning ability in dealing with difficulties is another way to improve metacognitive capability.

6.3.6 Summary of the results: improvements of metacognitive capability

In summary, factors of metacognition have significant influences on a positive learning experience. Therefore, it is important to improve students' level of awareness of DE delivery, reduce the difficulty of their experience, maintain motivation in learning and improve their effectiveness in each of the learning activities. These actions will improve students' overall learning capability, which is essential for their development of learning strategies.

6.4 The impact of individuals' background: the 'third dimension'

Finally, with reference to Table 7 on page 93, the influences of individual background information should be considered. Therefore, the following section analyses the differences between individuals through the evaluation of the multi-influences on their metacognitive capabilities.

6.4.1 Data analysis

6.4.1.1 Calculation of the value of learning capability

To achieve the purpose of these analyses, values of student learning capability (the rows and columns of Table 7) are aggregated to give a single total figure (from values of *awareness*, *ability*, *motivation*, and *self-evaluation*). The involvement of awareness, ability, motivation, and self-evaluation in overall capability of metacognition can be referred to Figure 35 on page 155. Also, the total values of these variables are calculated as the value of their capability in each main learning activity. New variables are thus generated as shown in Table 50 (the 'Total Value' column and row).

Table 50. Total value of students learning ability and metacognitive capability

	Awareness	Difficulties	Motivation	Effectiveness	Total value
Reading materials					*Capability in reading*
Understanding learning content					*Capability in cognition*
Seeking learning support					*Capability in seeking support*

Using technology					*Capability in using technology*
Dealing with feedback problems					*Capability in dealing with feedback problem*
Preparing for evaluations					*Capability in preparing evaluation*
Total value	*Awareness of DE*	*Cognitive ability*	*Ability to maintaining motivation*	*Effectiveness of strategy*	*Total value of metacognitive capability*

6.4.1.2 Analysing the impact of individuals' background on aggregate student learning capability

Once the new Total Values (shown in Table 55) have been calculated for individual respondents, these values can be subjected to further analysis. The analysis will explore whether any of the differences in individuals' backgrounds (for example, *age, gender, first language*) has an impact on their learning capability. This kind of statistical analysis relies upon establishing the presence (or absence) of differences between groups. The classic methods for doing this are T-test and ANOVA.

Some variables have two categories, such as *gender* (male and female) and *family responsibility* (yes and no). Some factors have more than two categories, such as *age* (which, for the purposes of this study has been categorised as *under-25, 25-34, 35-44, and 45-54*). Different techniques are applied based on the number of categories. According to Pallant (2010, p.239), the independent T-test is used when a comparison is required of 'the mean score, on some continuous variable, for two different groups of participants'. Thus the T-test is an appropriate technique for testing the impact of four (2-category) variables, namely: *gender*, *domestic responsibility*, *first language* and *cultural influences on educational background.* The interpretation of the results t-test is explained in Section 6.4.2.1 and it is applied in Section 6.4.2.

ANOVA is used in comparing the mean scores of more than two groups. As Pallant explains 'one-way between-groups ANOVA is used when you have one independent variable with three or more levels and one dependent continuous variable' (Pallant, 2010, p.250). To analyse the difference in learning capability between *age groups* and students who have different lengths of *learning experience in DE*, ANOVA is adopted to compare the means of capability values between groups.

6.4.2 Results of t-test and Levene's test on 2-category variables

6.4.2.1 Comparing the mean between genders

The data show that 97 participants are male and 54 female (64.2% and 35.8% respectively) (Figure 38). The difference between *student awareness*, *ability, motivation* and *evaluation of achievement* between males and females were tested.

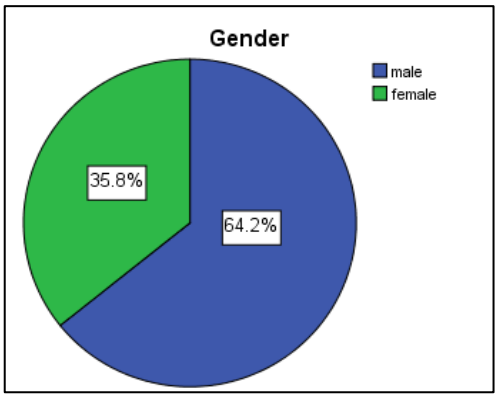


Figure 38. Findings of gender

To interpret the outcomes of statistical analysis, a result of Levene's test for equality of variance represents 'whether the variance (variation of scores for the two groups is the same' (Pallant, 2007, p.224). Pallant (2007) indicates that when the Sig. value is large than 0.05, the value of Equal variances assumed need to be referred furthered to; when the Sig. value is ≤0.05, the value of Equal variances not assumed need to be referred to. The results of statistical analysis (Table 51) show that all *p* values in Levene's test are higher than 0.05 and all *p* values in t-test for Equality of Means are above 0.05. This indicates that there is no significant difference between male and female participants in their level of learning capabilities.

Table 51. Output of t-test: comparing means of learning capability between gender

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference
Total value of awareness	Equal variances assumed	.903	.343	-.030	149	.976	-.01508
	Equal variances not assumed			-.032	127.696	.975	-.01508
Total value of learning ability	Equal variances assumed	.002	.967	.793	149	.429	.45533
	Equal variances not assumed			.787	107.380	.433	.45533
Total value of motivation	Equal variances assumed	.730	.394	1.198	149	.233	.65845
	Equal variances not assumed			1.167	101.503	.246	.65845
Total value of effectiveness of strategies	Equal variances assumed	.356	.551	.135	149	.893	.05918
	Equal variances not assumed			.142	125.687	.888	.05918
Total capability of reading	Equal variances assumed	.383	.537	.040	149	.968	.01814
	Equal variances not assumed			.039	99.750	.969	.01814
Total capability of cognition	Equal variances assumed	.090	.765	.211	149	.833	.08362
	Equal variances not assumed			.211	110.020	.833	.08362
Total capability of seeking support	Equal variances assumed	.019	.890	.235	149	.815	.10882
	Equal variances not assumed			.236	110.621	.814	.10882

Total capability of using technology	Equal variances assumed Equal variances not assumed	.130	.719	.990 .991	149 110.204	.324 .324	.44731 .44731
Total capability of learning without feedback	Equal variances assumed Equal variances not assumed	.085	.772	.116 .114	149 103.312	.908 .910	.04315 .04315
Total capability of preparing for evaluation	Equal variances assumed Equal variances not assumed	.526	.469	1.234 1.224	149 107.053	.219 .224	.45685 .457685
Overall learning capability	Equal variances assumed Equal variances not assumed	.745	.389	.764 .805	149 127.045	.446 .422	1.15788 1.15788

6.4.2.2 Comparing the mean between different experiences in higher education

Based on original responses, the country in which students obtained their highest qualification was defined as *Britain* or *International*. The categories of the new variable were coded as: 1=Yes (meaning *Britain*) and 2=No. The T-test is also used in analysing the impact of higher educational experience on relevant experience and students' learning capability. As shown in Figure 39, 99 students gained their highest qualification in the UK (65.6%), while 52 students did so in other countries (34.4%).

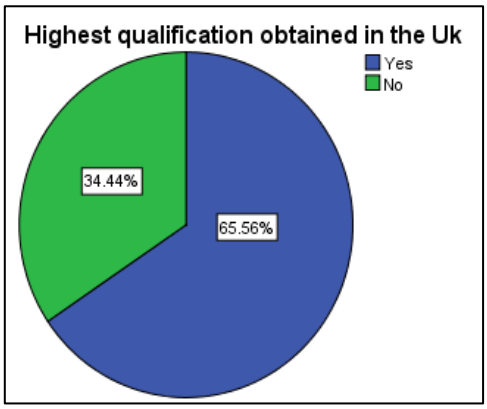


Figure 39. Highest qualifications obtained in the UK

By comparing the means of students' capability in each learning activity and their experience in each learning scale, the output of t-test analysis shows that all significance values are higher than .05. This indicates that there is no significant difference in learning capability between students who completed their higher education within and outside of the UK. The output of statistical analysis is shown in Table 52.

Table 52. Output of T-test: comparing means of learning capability between students who gained their highest qualification in the UK and those who did not

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Total value of awareness	Equal variances assumed	2.937	.089	.299	149	.765	.15035
	Equal variances not assumed			.323	127.921	.747	.15035

Total value of learning ability	Equal variances assumed	2.720	.101	-1.243	149	.216	-.71737
	Equal variances not assumed			-1.314	121.073	.191	-.71737
Total value of motivation	Equal variances assumed	6.050	.015	-1.308	149	.193	-.72475
	Equal variances not assumed			-1.418	128.742	.159	-.72475
Total value of effectiveness of strategies	Equal variances assumed	.004	.948	.969	149	.334	.42735
	Equal variances not assumed			.992	110.984	.323	.42735
Total capability of reading	Equal variances assumed	6.426	.012	.388	149	.698	.17638
	Equal variances not assumed			.427	133.206	.670	.17638
Total capability of cognition	Equal variances assumed	1.136	.288	-.023	149	.981	-.00932
	Equal variances not assumed			-.024	116.169	.981	-.00932
Total capability of seeking support	Equal variances assumed	4.145	.044	-.372	149	.711	-.17366
	Equal variances not assumed			-.411	135.083	.682	-.17366
Total capability of using technology	Equal variances assumed	.993	.321	-.382	149	.703	-.17444
	Equal variances not assumed			-.406	123.155	.685	-.17444
Total capability of learning without feedback	Equal variances assumed	5.477	.021	-1.053	149	.294	-.39336
	Equal variances not assumed			-1.136	127.556	.258	-.39336
Total capability of preparing for evaluation	Equal variances assumed	2.701	.102	-.774	149	.440	-.29002
	Equal variances not assumed			-.822	122.045	.413	-.29002
Overall learning capability	Equal variances assumed	5.420	.021	-.565	149	.573	-.86441
	Equal variances not assumed			-.628	136.322	.531	-.86441

6.4.2.3 Comparing the means of learners who have / do not have family responsibility

Figure 40 shows that 72 participants (47.7%) *have* family responsibility, while 79 (53.3%) *do not*. The differences in students' learning capability between the groups of students who *have* or *do not have* domestic responsibilities are tested. The result of the test is shown in Table 53.

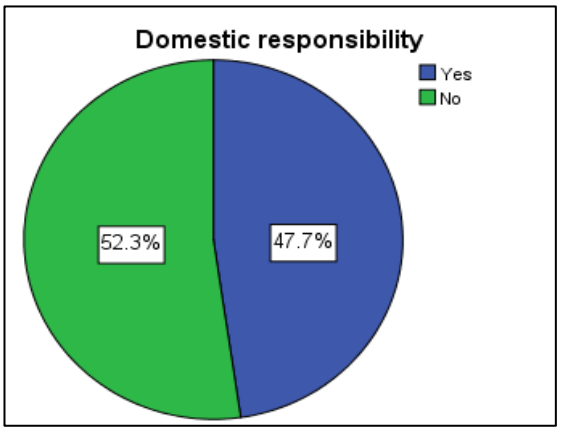


Figure 40. Findings of domestic responsibility

Table 53. Output of Independent Samples Test on the influences of family responsibility on learning experience

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total value of motivation	Equal variances assumed	5.847	**.017**	2.411	149	.017	1.253	.520	.226	2.281
	Equal variances not assumed			**2.443**	**143.656**	**.016**	1.253	.513	.239	2.268
Total capabilityof preparing for evaluation	Equal variances assumed	1.948	**.165**	**2.077**	**149**	**.040**	.731	.352	.036	1.426
	Equal variances not assumed			2.097	147.174	.038	.731	.349	.042	1.420

As Sig. value of Levene's *Test for Equality of Variances* is less than 0.05, the results of t-test referred to the second line in table 58 (i.e., *Equal variances not assumed*). The results show that there is a significant difference (p=.016<.05, n=151) in the level of motivation between students who have family responsibility (M=22.43, n=72) and those who do not have family responsibility (M=21.17, n=79). Also, the mean difference in students' capability in preparing for evaluation between students who have family responsibility (M=85.53, n=72)) and student who do not have family responsibility (M=83.21, n=79) is significant (p=.038). There are no other significant differences caused by family responsibility. The findings suggest that students who have family responsibility seem to be more motivated and more capable of preparing assessments and/or assignments than those do not have family responsibility. The result of the t-test is shown in Table 58.To check the reliability of the results; the effect size of the influence of family responsibility is calculated. Referring to Cohen (1988), the format for calculating the effect size is:

$$\eta^2 = t^2 / [t^2 + (N1 + N2 - 2)]$$

In the calculation of Eta squared (value of $\eta^{2)}$ for comparing participants who have family responsibility (n=72) and the participants who do not (n=79), t value in testing the means differences of motivation (t=2.44) and capability in preparing for evaluation (t=2.09) are applied in the format. By applying the suggested format, the effect size of family responsibility on learning capability is calculated. The effect size in motivation is:

$$\eta^2 = 2.44^2 / [2.44^2 + (72+79-2)]$$

$$= 0.038$$

In addition, the effect size for paired-samples t-test is calculated on analysing the influences of family responsibility on the capability of preparing assessments and/or assignments as:

$$\eta^2 = 2.09^2 / [2.09^2 + (72+79-2)]$$

= 0.028

Referring to Cohen (1988), a result of <0.01 represents a small effect; between 0.01 and 0.06 a moderate effect; and between 0.06 and 0.14, a large effect. Therefore, the effect size of family responsibility on student motivation and capability of preparing for evaluation is somewhere between small and moderate. This suggests that the influences of family responsibility on student learning experience are at least present in DE at postgraduate level.

6.4.2.4 Comparing the mean in analysing language influences

The data show that 110 participants use English as their first language, while 41 participants do not (Figure 41). The influences of language on students' learning experience are evaluated by comparing the means of their learning capability through T-test. The results show that there is significant difference (p=.004) in students' capability of dealing with feedback problems between the students who use English as their first language (M= 11.68, n=110) and those who do not use English as their first language (M= 12.68, n=41). T value is -2.987. The output of significant t value is selected in Table 54.

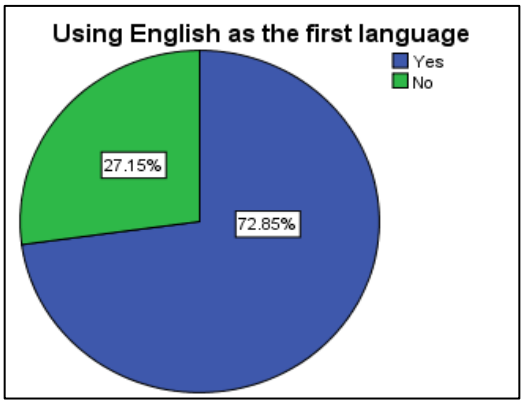


Figure 41. Using English as the first language

Table 54. Outputs of Independent Samples Test on language influences

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Total capability of learn without feedback	Equal variances assumed	9.303	**.003**	-2.552	149	.012	-1.001	.392	-1.776	-.226
	Equal variances not assumed			**-2.987**	**101.975**	**.004**	**-1.001**	**.335**	**-1.666**	**-.336**

The size of the influences of first language on learning capability is calculated as:

$\eta^2 = 2.98^2/[2.98^2 + (110+41-2)]$

= 0.004

The calculation of Eta squared shows that the effect size of language on international students' learning experience is moderate. There is .4% effect on the learning capability of dealing with feedback problems, which is explained by the first language.

6.4.2.5 The influences of the reasons for students studying by DE

The open ended question 'the reason for you studying by distance learning is' was answered by 100% of students. Eighty-one students expressed a single reason and 66 students stated multiple reasons in response to this question. The findings of the reasons why students learn by distance learning can be represented by 14 categories.

The most common reason for students to study by distance education is because they are full time employees. One of them commented that 'I can continue work full time and for not to affect by current work' and another replied 'distance education allows students to avoid possible loss of employment when studying.' Sixty-five respondents stated that full-time employment was the reason for them studying via DE. Other common reasons include 'Knowledge and skills improvement' (13 respondents), Career development (23 respondents), and 'Flexibility and continence' (28 respondents). Some students stated multiple reasons for deciding to learn on DE programme, for example, the combination of its flexibility, particular education needs, and financial advantage. One student stated that:

> 'I chose to study by distance because I had to work at the same time and because I could not find a programme similar to what I am doing now in the region where I live and work. Of course, another factor is the economic perspective. It is much cheaper because you don't spend money on accommodation'.

Students' reasons for studying by distance education are illustrated in Table 55.

Table 55. Reasons for students learning by DE

Order	Reasons	Frequency
1	**Employment**	**65**
2	Knowledge and skills improvement	13
3	Family responsibility	9
4	Geographical consideration	7
5	Career development	23
6	Sponsored by the employer	9
7	Knowledge application in developing experience	6
8	Particular educational needs	15
9	Credits for required professional qualifications	13
10	Financial advantage	13
11	Keeping busy	4
12	Requirement of degree	3
13	Personal development	4
14	**Flexibility**	**28**

The total frequency of each reason is calculated and the result show that the most frequently mentioned reason is employment (65 responses); and like the flexibility (28 responses). These two reasons are used in the analysis of their influences on students learning capability by t-test The output shows that there is no significant difference in scores for learning capability no matter if the reason for studying by DE is *employment* (Table 56) or *flexibility* (Table 57).

Table 56. The output of T-test: the influence of the reasons for selecting distance education (employment)

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference
Total value of awareness	Equal variances assumed	.074	.786	1.708	149	.090	.81106
	Equal variances not assumed			1.706	143.750	.090	.81106
Total value of learning ability	Equal variances assumed	.002	.965	.353	149	.725	.19530
	Equal variances not assumed			.356	147.905	.723	.19530
Total value of motivation	Equal variances assumed	.156	.693	.530	149	.597	.28119
	Equal variances not assumed			.529	143.941	.598	.28119
Total value of effectiveness of strategies	Equal variances assumed	.903	.343	-.138	149	.891	-.05815
	Equal variances not assumed			-.139	148.552	.890	-.05815
Total capability of reading	Equal variances assumed	.304	.582	1.478	149	.142	.55938
	Equal variances not assumed			1.478	144.830	.142	.55938
Total capability of cognition	Equal variances assumed	.618	.433	-.209	149	.835	-.09314
	Equal variances not assumed			-.211	147.866	.834	-.09314
Total capability of seeking support	Equal variances assumed	.219	.641	.551	149	.582	.24037
	Equal variances not assumed			.554	146.877	.580	.24037
Total capability of using technology	Equal variances assumed	.285	.594	-.883	149	.379	-.31495
	Equal variances not assumed			-.881	143.868	.380	-.31495
Total capability of learning without feedback	Equal variances assumed	.136	.713	1.209	149	.229	.43072
	Equal variances not assumed			1.208	143.907	.229	.43072
Total capability of preparing for evaluation	Equal variances assumed	.008	.927	.844	149	.400	1.22941
	Equal variances not assumed			.845	145.432	.399	1.22941
Overall learning capability	Equal variances assumed	.040	.842	.942	149	.348	.40703
	Equal variances not assumed			.944	145.864	.347	.40703

Table 57. The output of T-test: the influence of reasons for selecting distance education (liking flexibility)

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Total value of awareness	Equal variances assumed	.748	.388	-1.675	149	.096	-1.41249
	Equal variances not assumed			-2.258	17.085	.037	-1.41249
Total value of learning ability	Equal variances assumed	2.120	.147	-.140	149	.889	-.13768
	Equal variances not assumed			-.203	18.217	.841	-.13768
Total value of motivation	Equal variances assumed	4.604	.034	.261	149	.794	.24638
	Equal variances not assumed			.460	23.133	.650	.24638
Total value of effectiveness of strategies	Equal variances assumed	.186	.667	.152	149	.879	.11427
	Equal variances not assumed			.169	15.050	.868	.11427
Total capability of reading	Equal variances assumed	.681	.411	-1.239	149	.217	-.83501
	Equal variances not assumed			-1.447	15.484	.168	-.83501
Total capability of cognition	Equal variances assumed	4.022	.047	-.321	149	.749	-.25418
	Equal variances not assumed			-.561	22.823	.580	-.25418
Total capability of seeking support	Equal variances assumed	2.197	.140	.216	149	.829	.16722
	Equal variances not assumed			.341	19.921	.737	.16722
Total capability of using technology	Equal variances assumed	2.953	.088	.345	149	.731	.21906
	Equal variances not assumed			.523	19.038	.607	.21906
Total capability of learning without feedback	Equal variances assumed	1.634	.203	-.169	149	.866	-.10758
	Equal variances not assumed			-.208	15.955	.838	-.10758
Total capability of preparing for evaluation	Equal variances assumed	3.909	.050	-.459	149	.647	-1.18952
	Equal variances not assumed			-.766	21.383	.452	-1.18952
Overall learning capability	Equal variances assumed	1.824	.179	-.493	149	.623	-.37904
	Equal variances not assumed			-.647	16.741	.526	-.37904

6.4.2.6 Summary of the outcomes of t-test

In summary, means of student learning capability are compared between two categories of gender, family responsibility, use of English as a first language, and higher education experience in the UK in this section. The outputs of the statistical analysis show that there are no significant differences in learning capability between males and females, higher education in Britain and other countries, or different reasons for study by DE. In addition, compared with the students who have family responsibilities, student who do not are more motivated and more capable when preparing for evaluations. Furthermore, language influences on learning capability exist. Students who use English as their first language are less capable of dealing with feedback problems than students who are non-native speakers.

6.4.3 Results of ANOVA analysis on multiple-category variables

6.4.3.1 Comparing the mean differences between age groups

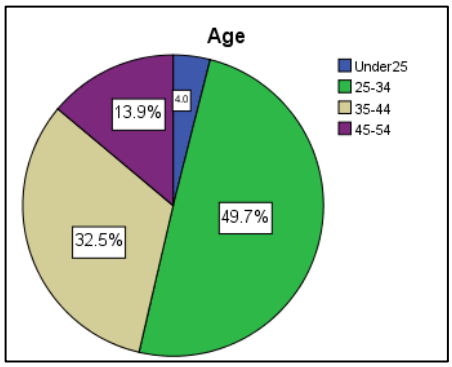


Figure 42. Findings of age

Participants were divided into five groups: Group 1: under 25; Group 2: 25-34; Group 3: 35-44; Group 4, 45-54; group 5, over 54. Data show that the majority of participants are aged between 25 and 34 (49.67%), 32.45% of participants aged 35-44, 13.91% aged 45-54 and 4.0% aged under 25. No participant is over 54. These findings are shown in Figure 42. One-way between groups analysis of variance was conducted to explore the impact of age and experience of distance learning on metacognitive capability. There was no participant in Group 5.The output of statistical analysis is shown in Table 58.

Table 58. Output of statistical analysis of one-way between-groups ANOVA with post hoc tests: age influences on learning capabilities

		Sum of Squares	df	Mean Square	F	Sig.
Total value of awareness	Between Groups	9.871	3	3.290	.380	.768
	Within Groups	1273.228	147	8.661		
	Total	1283.099	150			
Total value of learning ability	Between Groups	56.420	3	18.807	1.671	.176
	Within Groups	1654.189	147	11.253		
	Total	1710.609	150			
Total value of motivation	Between Groups	33.746	3	11.249	1.072	.363
	Within Groups	1542.599	147	10.494		
	Total	1576.344	150			
Total value of effectiveness of strategies	Between Groups	4.514	3	1.505	.223	.880
	Within Groups	990.413	147	6.738		
	Total	994.927	150			

Total capability of reading	Between Groups	32.084	3	10.695	1.545	.205
	Within Groups	1017.347	147	6.921		
	Total	1049.430	150			
Total capability of cognition	Between Groups	6.636	3	2.212	.404	.750
	Within Groups	805.311	147	5.478		
	Total	811.947	150			
Total capability of seeking support	Between Groups	29.887	3	9.962	1.356	.258
	Within Groups	1079.610	147	7.344		
	Total	1109.497	150			
Total capability of using technology	Between Groups	10.384	3	3.461	.483	.694
	Within Groups	1052.503	147	7.160		
	Total	1062.887	150			
Total capability of learning without feedback	Between Groups	**44.568**	3	14.856	3.259	**.023**
	Within Groups	**670.107**	147	4.559		
	Total	714.675	150			
Total capability of preparing for evaluation	Between Groups	13.555	3	4.518	.946	.420
	Within Groups	701.796	147	4.774		
	Total	715.351	150			
Overall learning capability	Between Groups	122.497	3	40.832	.509	.676
	Within Groups	11782.245	147	80.151		
	Total	11904.742	150			

The results in Table 58 show that *age* only influences student capability when dealing with feedback problems. The value of learning capability in dealing with feedback problems varies between age groups ($p<.05$). Post hoc tests are applied to explore the differences. Post hoc comparisons using the Tukey HAD test indicate that the mean score in Group 2 ($M=11.49$, $n=75$) is significantly different from Group 3 ($M=12.55$, $n=49$). This difference is indicated by the *P* value in the table of Multiple Comparisons ($p<.05$). The output of the statistical analysis is shown in Appendix 18. The mean difference (1.06) between Group 2 and Group 3 is shown in Figure 43.

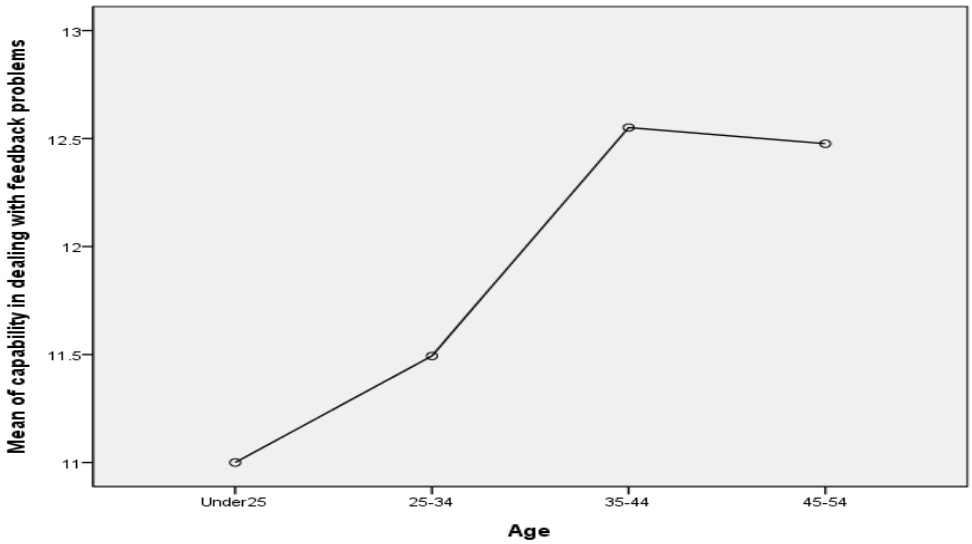


Figure 43. Mean plots of age differences when dealing with feedback problems

Figure 43 clearly illustrates that participants who are aged at 25-34 are more capable in dealing with the feedback problems than participants who are 25-34. To further test the validity of this result, the effect size of the age influences on students' experience of dealing with feedback problem is calculated through the format:

η^2 = Sum of squares between groups/total sum of squares

the results ANOVA analysis (see Table 59) shows that when comparing the total values of learning capability when dealing with feedback problems, the value sum of squares for between groups is 44.57. The value of the sum of squares for with groups is 670.11. The value of eta squared is therefore calculated as:

$\eta^2 = 44.57/670.11$

$=.067$

This is considered to be a moderate effect. Within the multi-influences on learning, a significant moderate effect is suggested for the consideration of pedagogical design. The students who are aged 35-44 are 32.5% of the total number of participants, and 49.7% are aged 25-34. The differences between the two groups in dealing with feedback problems imply the need for consideration of both groups in terms of the issue of feedback. The higher capabilities of students who are aged 35-44 indicate the influence of personal experience on their perspectives and reactions to tutors' comments and feedback.

6.4.3.2 Comparing means between different length of DE experience

The length of time students have been involved in distance learning is divided into 5 categories: less than 6 months (15.2%), 6 to 12 months (12.6%), 13-18 months (27.2%), 19-24 months (13.2%) and Over 24 months of experience (31.8%). The findings of participants' experience in DE are shown in Figure 44.

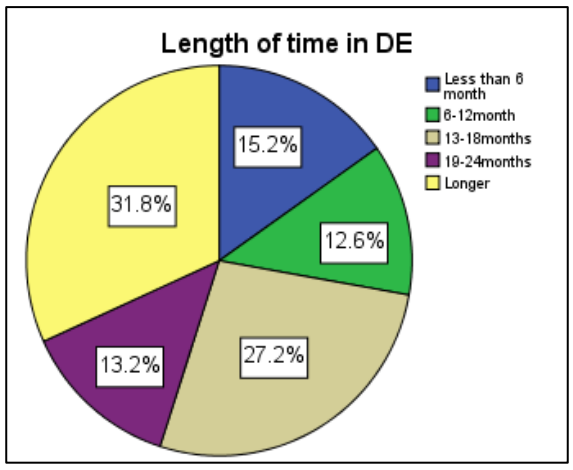


Figure 44. Length of DE experience

ANOVA analysis is used to test whether students' previous experience in DE impacts on their metacognitive experience. Students' experience in DE is divided into five categories: less than 6 months, 6-12 months, 13-18 months, 19-24 months and longer. The test is conducted between their experience in DE and each identified value of metacognitive learning capabilities. One significant value is found from the outputs, which shows that there are differences in students' capability of preparing

assessments and/or assignments somewhere between the lengths of experience in DE. The outputs of AVOVA are presented in Table 59.

Table 59. Output of One-way between-groups ANOVA with post hoc tests: the influence of previous DE experience on learning capability

		Sum of Squares	df	Mean Square	F	Sig.
Total value of awareness	Between Groups	27.369	4	6.842	.796	.530
	Within Groups	1255.731	146	8.601		
	Total	1283.099	150			
Total value of learning ability	Between Groups	18.870	4	4.718	.407	.803
	Within Groups	1691.739	146	11.587		
	Total	1710.609	150			
Total value of motivation	Between Groups	43.144	4	10.786	1.027	.395
	Within Groups	1533.200	146	10.501		
	Total	1576.344	150			
Total value of effectiveness of strategies	Between Groups	8.477	4	2.119	.314	.868
	Within Groups	986.450	146	6.757		
	Total	994.927	150			
Total capability of reading	Between Groups	55.212	4	13.803	2.027	.094
	Within Groups	994.218	146	6.810		
	Total	1049.430	150			
Total capability of cognition	Between Groups	23.424	4	5.856	1.084	.367
	Within Groups	788.523	146	5.401		
	Total	811.947	150			
Total capability of seeking support	Between Groups	20.033	4	5.008	.671	.613
	Within Groups	1089.464	146	7.462		
	Total	1109.497	150			
Total capability of using technology	Between Groups	6.266	4	1.567	.216	.929
	Within Groups	1056.621	146	7.237		
	Total	1062.887	150			
Total capability of learning without feedback	Between Groups	13.093	4	3.273	.681	.606
	Within Groups	701.582	146	4.805		
	Total	714.675	150			
Total capability of preparing for evaluation	Between Groups	46.697	4	11.674	2.549	**.042**
	Within Groups	668.654	146	4.580		
	Total	715.351	150			
Overall learning capability	Between Groups	180.366	4	45.092	.562	.691
	Within Groups	11724.376	146	80.304		
	Total	11904.742	150			

The impact of DE experience on learning capability with regard to preparing assessments and/or assignments is further analysed through mean difference. The outputs show that all *p* values (Sig.) in the table of multiple comparisons are higher than .05 (Table 60). This indicates that there are no statistical differences at the $p<.05$ level in students' capability of preparing assessments/assignments in the five groups. It is therefore clear that there is no statistical significance on the impact of DE experience in learning capability.

Table 60. Multiple Comparisons of Mean differences between lengths of previous experience

(I) TiminDe	(J) TiminDe	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Less than 6 months	6-12 months	-.95423	.66345	.604	-2.7868	.8783
	13-18 months	.46554	.55752	.919	-1.0744	2.0055
	19-24 months	-1.01739	.65430	.529	-2.8247	.7899
	Longer	.13678	.54271	.999	-1.3623	1.6358
6-12 months	Less than 6 months	.95423	.66345	.604	-.8783	2.7868
	13-18 months	1.41977	.59392	.124	-.2207	3.0603
	19-24 months	-.06316	.68559	1.000	-1.9569	1.8306
	Longer	1.09101	.58005	.332	-.5112	2.6932
13-18 months	Less than 6 months	-.46554	.55752	.919	-2.0055	1.0744
	6-12 months	-1.41977	.59392	.124	-3.0603	.2207
	19-24 months	-1.48293	.58369	.087	-3.0952	.1293
	Longer	-.32876	.45510	.951	-1.5858	.9283
19-24 months	Less than 6 months	1.01739	.65430	.529	-.7899	2.8247
	6-12 months	.06316	.68559	1.000	-1.8306	1.9569
	13-18 months	1.48293	.58369	.087	-.1293	3.0952
	Longer	1.15417	.56956	.259	-.4191	2.7274
Longer	Less than 6 months	-.13678	.54271	.999	-1.6358	1.3623
	6-12 months	-1.09101	.58005	.332	-2.6932	.5112
	13-18 months	.32876	.45510	.951	-.9283	1.5858
	19-24 months	-1.15417	.56956	.259	-2.7274	.4191

6.4.4 The influences of student expectation on tutor feedback

To analyse the strategies used in relation to the feedback, students' perspectives on tutor feedback were explored. The item used to explore what tutor feedback and comments mean to the students is 'please state what feedback and tutor's comments mean to you in developing learning'.

Some participants expressed a positive view of the issue of feedback. For example, one student stated that 'support from tutors was limited, they would not reply to emails for days and sometimes not at all', and another one positively stated that 'I have not failed to obtain feedback in time. It always comes in time, within reason, less than a month which in my opinion is fair'. However, 10 participants believe that feedback is useless for learning efficiency, for instance, 'They [tutor] were useless, so they did not in any way develop my learning', 'It [feedback] is always looking back on a subject that is not related to the next one so is generally not relevant'. One student looked at self-learning in DE with a negative attitude because of the lack of feedback:

> Everything – without any meaningful face-to-face dialogue it is their duty to give you detailed feedback. This did not occur in 90% of cases and was simply excused as an 'academic' style of feedback to try to get you to learn more yourself. Absolutely rubbish!

Conversely, one student believes that feedback should not be expected in distance learning. This student stated:

> The whole course has had to be approached without the benefit of detailed or effective feedback so it is largely a matter of using the online forum to find out what other students did and try to extrapolate the differences to identify areas for further study.

The statistics show that 6.6% of participants expressed negative feelings about the role of feedback and 17.9% of them did not respond to the question. Apart from this, the majority of participants (84.85%) reveal their expectations on tutors' comments. The findings here are opposite to their report of internal locus of control. However, as the number of students who have negative perspectives is small, the data do not permit a further statistical analysis. The findings are summarised in a list of categorises shown in Table 61.

Table 61. Findings of the meaning of feedback to the students

No	Findings	Frequency
1	It is important in distance learning	12
2	It is the connection between students and tutors	5
3	It provides the standard of evaluation	11
4	It can keep the study in right direction	17
5	It is the guidance for improving learning skills and knowledge	19
6	It provides the focus of the important areas	2

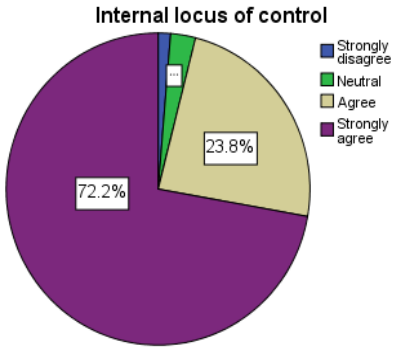
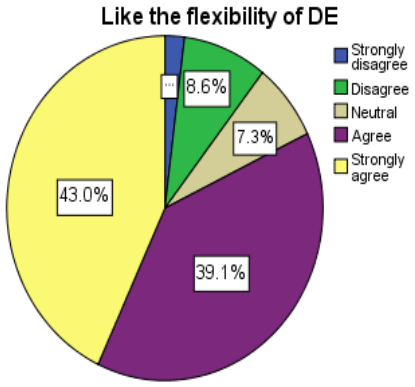
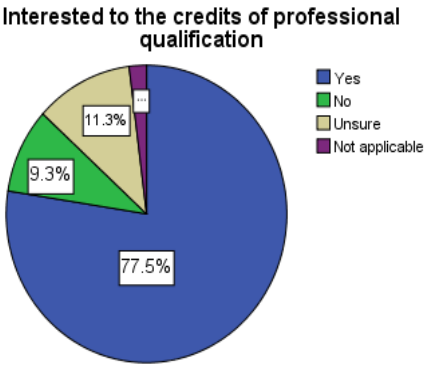
7	It motivates the learners	13
8	It helps to correct mistakes and solve problem	12
9	It provides constructive criticism	3
10	It can instil confidence	2
11	It helps student be aware of the level of self-capability in learning	3
12	It provides support and guidance for assessment	9
13	It helps to find weak areas to focus on	16
14	It provides encouragement	1
15	It can support group decisions	1
16	More feedback is needed	2
17	It is useless	10

Following analysis, the findings in this section show the confusions of students' perspectives and actions related to feedback in distance learning. This thesis therefore argues that awareness of the nature of DE and the positive ways to solve problems is important for distance learners.

6.4.5 The influences of students' learning preferences

Locus of control, needs of flexibility, and interest in professional qualifications are discussed as the relevant factors which influence distance learning experience (Chapter Three). These are examined from the findings of questionnaire survey. Data show that the majority of students have internal locus of control (72.2% strongly agree and 23.8% agree); like the flexibility of distance learning (43.0% strongly agree and 39.1% strongly agree), and are interested in professional qualifications (77.5%). The numbers of the responders on the categories (for example, disagree and strongly disagree) are less than 5. Further analysis of the effects of these factors on leaning capabilities is therefore not valid. Details of the findings are shown in Table 62.

Table 62. Relevant learning experience

Item	Categorises	Frequency	Percent	Figure
Locus of control	Strongly disagree	2	1.3%	
	Neutral	4	2.6%	
	Agree	36	23.8%	
	Strongly agree	109	72.2%	
	Total	151	100.0%	
Like the flexibility of DE	Strongly disagree	3	2.0%	
	Disagree	13	8.6%	
	Neutral	11	7.3%	
	Agree	59	39.1%	
	Strongly agree	65	43.0%	
	Total	151	100.0%	
Interest in provided credits	Yes	117	77.5%	
	No	14	9.3%	
	Unsure	17	11.3%	
	Not applicable	3	2.0%	
	Total	151	100.0%	

6.4.7 Summary of the influences of multi-factors on learning capability

In summary, the statistical analysis in this section suggests (i) Gender has no impact on distance learning experience and student metacognitive capability; 2) Students who have family responsibility are more motivated and capable when preparing assessments and assignments; (iii) Students whose first language is not English are more capable of dealing with feedback problems; (iv) Previous experience in higher education in the UK has no impact

on distance learning experience; (v) There is no significant difference caused by the reasons for students studying by DE; (vi) Students' capability in dealing with feedback problems is different between students who are aged 25-34 and 35-44. The statistics suggest that students who are aged 35-44 report higher capability in dealing with feedback problems compared with students who are 25-34; (vii) Students' previous experience in DE has no impact on current learning experience.

6.5 Summary of the chapter

To summarise, distance learners' ability to use strategies is varied. On one hand, some students are aware of their own situation and are able to apply certain strategies. They are capable of creatively developing a combination of different types of strategies for their learning effectiveness. On the other hand, a few students have either no strategy or just a single strategy. The learning strategies which have been used by other students are not necessarily made aware to them. These students need to develop their metacognitive awareness to suit the features of distance learning.

Results of statistical analysis suggest that students' metacognitive capability could be improved through the development of student awareness of DE, development of learning ability and improvement in their knowledge of learning strategies. Provision of one of these aspects can guide the improvement of the others. The results of statistical analysis show strong correlations between five scales of learning which were originally presented in Chapter Four. Improvement in metacognitive capability can therefore be addressed in the development of five scales of learning in this thesis. This original approach allows discussion of pedagogical design in Chapter Seven.

A main issue of pedagogical design in DE is to emphasize individual differences, which has been analysed in current chapter. The results of both qualitative and quantitative analysis suggest that first language, domestic responsibility and previous learning experience have significant influences on metacognitive capability. The non-significant correlations between gender, highest qualification and experience in DE suggest that these factors are not barriers to learning success in DE.

Chapter Seven - Discussions and Conclusion

7.1 A summary of the achievements of the research objectives

The aim of this study was to critically appraise student experience of using strategy by exploring the experience of distance learners. To achieve the final aim, a number of objectives were set in two stages of this study (see Section 1.2). The research objectives in stage one were:

- To understand how learning experience is influenced by DE delivery
- To explore how students learn in DE
- To identify the key to distance learning success in the distance learning environment

An initial case study was carried out and the data collected from the initial case study were analysed in the light of theories of learning and educational psychology and a number of frameworks were developed upon which to focus a research survey. The objectives in the first stage hence are achieved by the following results:

i. Student learning experiences are influenced and shaped by the way DE is delivered. Applied pedagogies impact students' experience through the role of teacher, design of support and use of technology (see Section 3.5.4 and Table 6 on page 77). Distance learners mainly learn independently, interactions are used as learning strategies under their own choice of which learning strategy is the most suitable one to their situation (see Section 3.5.1 and 3.5.2).
ii. Six groups of main learning activities are defined to discover the 'iceberg' of student independent learning experience based on how DE delivered and what are expected from student activities (see Figure 26 on Page 75).

The discussions in Chapter Four highlighted that a key to distance learning success is metacognition and it reflects on what and how learning strategies are used. Further research therefore attempts to test this new approach as a hypothesis. Research objectives in second stage therefore were updated into two parts.

The research objective addressed in Chapter Five was 'to test the role of using strategies in achieving success in distance learning'. It has been achieved based on the findings of an online questionnaire survey. The survey provided both qualitative and quantitative data. Based on analysing the findings, relevant objectives are achieved. These achievements are summarised as following:

i. All participants used learning strategy/ies in distance learning and most illustrated strategies which developed form literature and initial study were used by the majority of participants.
ii. Use of learning strategies is important to learners who are isolated from their instructors and it is creatively applied for the purpose of self-direction, self-regulation and cognition.
iii. Use of learning strategies is effective to positive learning experience which considers higher level of learning outcomes, higher satisfaction on obtained knowledge, reduction of isolation and distraction, and higher level of engagement.

In addition, to achieve the aim of developing pedagogy, potential improvements of students' metacognitive capability need to be evaluated and following research objective was achieved in Part Two in Chapter Six, i.e., 'to evaluate the potential improvements of metacognitive capability'. The results of data analysis in achieving this research objective include:

i. Distance learners need to improve their metacognitive capability in order to be able to select, develop and combine appropriate strategies for learning success.
ii. Metacognitive capability can be improved through the development of students' awareness of DE delivery, reducing difficult experience and improve level of motivation.
iii. Design of DE needs to consider the differences between learners, such as gender, family responsibility, and their use of first language.

In short, analysing the data collected from the initial case study and survey finally allow the achievements of all research objectives. Based on these achievements, discussions of how to promote effective learning experience and the innovations in pedagogical design of DE delivery are able to be carried out. Eventually, the aim of this study is achieved in current chapter.

7.2 Discussions: how to achieve learning effectiveness

7.2.1 Pursuing successful learners

7.2.1.1 The key to learning success

The findings confirm that distance learners at postgraduate level mainly learn on their own. The data show that students selectively carry out interactive activities for particular needs. In addition, difficulties in learning, personal life, and the nature of DE (the separation of teaching and learning) were found to be reasons for students developing learning strategies. These difficulties create the need to maintain motivation and retain engagement. Learning strategies,

therefore, are developed by the individuals, depending on their own situations. The various applications of learning strategies in different situations demonstrate how learning strategies can be used creatively and flexibly.

Based on the findings of the Case Study, this thesis argues that in the complex learning environment students' willingness and effort in taking self-responsibility for managing unpredicted situations are essential. Metacognition is then emphasised as the key to learning success in DE and the role of interaction in DE is redefined as one of the learning strategies for distance learners. A review of previous research has revealed a gap in the systematic study of multi-influences and multi-aspects of metacognition. This study therefore, carries out a multi-factorial examination of the student metacognitive learning experience. Student learning strategy is the main focus of this study and is investigated through a questionnaire survey.

7.2.1.2 The advantages of distance learners

Based on the findings of qualitative and quantitative data on how illustrated strategies were used, it is established that distance learning involves the need to balance several factors within very complex social, domestic, workplace environment and online learning environment. Findings of the questionnaire survey include self-directed strategies, self-regulated strategies and cognitive strategies from student experience, and show how learning capability can develop the ability to deal with difficulties in distance learners' experiences. Students' learning skills are developed within the learning process along with the development of learning strategy. For instance, IT skills developed when using technologies, cognitive skills developed along with the development of cognitive strategies and communication skills developed along with the participants' interactions. As discussed by Weiburg and Ullmer (1995), learning strategies can contribute to maintaining productivity in the lifelong learning environment. This thesis argues that the development of lifelong learning capability in distance learners' experience is much of much greater importance than it is for students in on-campus study because of the multiple difficulties they experience. The process of distance learning can result in the enhancement of learning capability. The development of learning capability (learning skills and learning strategy) in the distance learning experience can actually serve as an advantage to distance learners, who can develop a better facility for lifelong learning than students in on-campus study.

The ability to learn independently is a skill that is expected of students at postgraduate level (QAA, 2008). The particular situation the student faces in distance learning requires this even more. To solve the associated problems without face-to-face teaching requires that knowledge is expanded and critically analysed in both self-learning (students' own efforts) and socialised learning environments (interactions in the work environment). The potential for students' independent learning skills can therefore be tested and developed. Ultimately, the objectives

of higher education at postgraduate level can be achieved, based on strong sense of independent learning.

In a knowledge-based society, it is increasingly important for people to become effective lifelong learners as 'learning is a central lifelong task that provides us with the basis of personal development and a successful career' (Payne and Whittaker, 2006, p.8).This thesis argues that learning by DE can implant a strong capability for lifelong learning. Compared with students in on-campus learning, distance learners can enjoy the advantage of having developed powerful self-development skills for the future.

7.2.1.3 Proposed emphasis in the design of DE - metacognition

There is a clear need for emphasising, the development of metacognitive capability in DE. It will firstly improve student self-contribution through their recognition of DE's nature, maintain motivation and develop ability to deal with difficulties. Secondly, the quality of higher education can then be ensured by increased engagement. Thirdly, the advantage of students' learning on lifelong learning skills can be enhanced. This thesis therefore proposes that DE pedagogy needs to include the development of students' metacognitive capabilities and to emphasize this feature in the design and operation of DE delivery.

This thesis highlights the fact that the key to metacognitive capability is to develop appropriate strategies for learning effectiveness. There is no fixed set of learning skills appropriate to all circumstances and all learners (Gibbs, 1981). To be aware of what needs to be done, to have the ability to handle the problems, to be motivated in taking action and to be effective in using strategy are as important as the strategy itself.

In addition, the issue of student diversity discussed in previous literature appears in the findings of this study. The initial case study firstly found that student perspectives on DE are various; in addition, results of statistical tests reveal the impacts of first language, domestic responsibility and age on metacognitive capability. Students who use English as a first language are more capable of dealing with feedback problems; students who have family responsibilities are more motivated and have higher capability in preparing the evaluation compared with students who do not; students who are aged between 34 to 45 are more capable of dealing with feedback problems than the students who are aged from 25-34. The features of learners such as age, language and domestic responsibility all represent different needs of learning. One way to meet the needs of a diverse student population and give everyone an equal chance of learning is to develop students' learning capabilities and allow them to achieve their needs by themselves.

7.2.2 Discussions of how to develop metacognitive capability

The findings suggest the possible advantages for distance learners in terms of giving them a

better lifelong learning capability. However, the limitation of individual's knowledge cannot be ignored. This thesis therefore suggests that on one hand, the advantages of distance learners need to be realised; on the other hand, individual learner needs to improve their capability for achieving effective distance learning. Hence, pedagogical guidance is needed to contribute to achieving this purpose.

The improvement of metacognitive capability has been examined through statistical analysis. Firstly, student awareness, ability, motivation and self-evaluation have been found to be significant factors in producing a positive learning experience. Secondly, the demands of learning strategies exist in most participants' experiences. This study found the improvement of metacognitive capability requires the development of students' awareness, learning ability and knowledge of learning strategies.

7.2.2.1 Improving student awareness

Firstly, distance learning has its particular features of isolation, flexibility and inconvenience in producing feedback. Student learning is strongly influenced by students' expectations of learning and their compatibility with institutional conventions (Gaskell, 2009a). Students need to be aware of and accept these features when their learning is restricted by factors of time and geography. Findings of the strategies used to deal with the lack of feedback highlights the awareness of feedback problems and the need for self-contribution. Being aware of the nature of distance learning can help students have appropriate perspectives and expectations. In addition, issues caused by the features of distance learning should be understood by the learners. For example, lack of direction and feedback are caused by the nature of DE. This is one of the sources of difficulty and negative emotion. Awareness of these issues will help prepare the learners to develop relevant strategies and avoid negative feelings.

In addition, being aware of the need for self-responsibility in distance learning is important for those who decide to adopt this method. The strategy of using existing knowledge, extra reading and available documents shows that the questions could be answered by self-effort. Attitude and self-responsibility are critical characteristics of a student in dealing with the problems of getting effective feedback. 'One of the most important principles of educational psychology is that teachers cannot give students knowledge' (Slavin, 2000, p.255). Within the distance learning environment, it is important that learners are aware of their responsibilities and engage in a self-regulated environment. This, in addition, requires awareness of available learning resources, provided support and use of technology. To have knowledge of DE programme can reduce students' lack of direction, creating appropriate expectations for their learning environment, and improving their use of support. Difficult experiences will then be reduced and learning effectiveness may be improved.

Furthermore, students need to be aware of their self-condition as learners. Individuals have their own strengths and weaknesses in learning; also, individuals have different cognitive and learning styles. Students need to select or develop an appropriate combination of learning strategies which are suitable for their own demands. The use of various strategies in students' experience shows their different learning styles, level of cognitive knowledge, and capability in developing strategies. Researcher argues that development of an awareness of students' own preferred learning is an essential element of effective learning, for example, '…It influences how information is collected, organised and transformed, and refers to the ways in which they learn best and how learning is approached'(Payne and Whittaker, 2006, p.13).

In discussion, improving students' awareness not only relates to what they know about DE, but is more connected with how they can know about it. DE delivery firstly needs to be changed to achieve the purpose of both what students need to be aware of and how to improve their overall awareness. However, student awareness on distance learning environment and effective learning are found from a small number of participants. Most students need to improve their awareness of distance learning and learn from others experience.

7.2.2.2 Providing the knowledge of educational psychology

Strategies are used differently by individuals. The findings indicate that an individual's ability to use learning strategy varies. One individual may be struggling with the feelings of isolation, while another might have developed multi-strategies in his/her learning. Also, the same scenario produces different weight of psychological influences on individuals. While one student shows no psychological impact, another may present strong negative feelings.

There is strong evidence of the need to deal with the difficulties in students' experiences. These abilities include learning in a limited time, learning within various distractions and learning without the use of cognitive activities. Knowing how to achieve cognitive efficiency is the basis for students' learning decisions.

In comparison with on-campus learning environment, many functions of teaching are absent in the distance learning environment. For example, the combinations of different activities are designed in classroom teaching such as listening, interactions and practice. Psychologists indicate that cognitive effectiveness is influenced by emotion and the function of two parts of the human brain (Riding and Rayner, 1998; Frijda, 2001). Through the design of classroom activities, the functions of two parts of the human brain can then be combined to achieve the objective of learning. This is difficult to be addressed in DE. Even though psychological design is considered in learning materials in some cases, the evidence in this thesis has shown it to be a weakness of distance learning. In addition, the lack of findings in cognitive strategies indicate that only a small number of distance learners have a knowledge of cognition and

educational psychology, and this is rarely applied in learning strategy. In addition, the absence of psychological design in DE needs to be remedied. The theoretical foundation of pedagogy is educational psychology. In DE, face-to-face teaching does not occur. Students review important points to achieve deep understanding; link the learning content to their work situation, and diagnose weaknesses. To support students in being effective in self-teaching, this study therefore argues that educational psychology should be part of knowledge provided to students in DE.

7.2.2.3 Developing the knowledge of learning strategies

Student experiences of using learning strategies have been researched using the focus group interview in the initial case study and again with the questionnaire survey. The findings show that: (i) distance learners successfully develop their learning strategy by experiencing difficulties. However, there are some persistent difficulties that have been experienced by the students. (ii) Individuals differ in the type of strategies they adopt; most students are only aware of a few strategies. Some difficulties which they are experiencing have been strategically solved by their peers. (iii) Most of the learning strategies elicited from the focus group were used by the majority of participants in the survey research. However, some of these did not appear as common activities. The findings suggest that selection of learning strategy is critical to individual learners. (iv) The knowledge of learning strategy presented in this thesis shows how the same strategies can be used in different situations and how those strategies can be combined. (v) Use of strategies is significant in reducing feelings of isolation and distraction, encouraging willingness to learn and student engagement.

Therefore, knowledge of learning strategies is vitally important to develop metacognitive capability; and development of metacognitive capability requires knowledge of how learning strategies are applied in different situations for different purposes. However, researchers have previously concentrated on the categories of learning strategy; there is lack of knowledge of how these strategies can be critically applied.

The findings of this thesis suggest that the source of knowledge of learning strategy is the student's learning experience. How strategies are developed and applied to deal with difficulties by one student is significant for other students in similar situations. Knowledge of learning strategies such as addressed in this thesis is essential for distance learners. This will allow the transformation of new knowledge as a general technique. This thesis hence argues that knowledge of learning strategy in DE needs to be learnt from individual experience. The development of this knowledge is a continuous mission for researchers and educationalists.

The pedagogical dilemma was approached at the beginning of this thesis and the investigation of student learning experience was engaged. Based on the findings of how learning

experiences are shaped and influenced by DE delivery in a case study, the reactions between theory and practice can be observed. When a problem occurs in practice, it is difficult to improve the situation by means of an applied pedagogy, as this can even exacerbate the problem. This is discussed in the next section in order to further contribute to pedagogical improvement.

7.3 Discussions of the changes in pedagogical design of DE

7.3.1 Philosophical approach on developing DE pedagogy

As demonstrated by this research, distance learners mainly learn independently and their engagement varies in an invisible environment. The dilemma in developing the principles to guide learning is challenged by the very nature of DE. A real problem that has emerged, therefore, is how to manage DE. This is necessarily related to how to apply pedagogy and how to improve the design of DE delivery. All theories have its limitations. The use of particularly theory as guidance in DE delivery can cause confusion in practice when problems occur (see Figure 45). This is demonstrated by the barriers to DE development exposed in the Case Study.

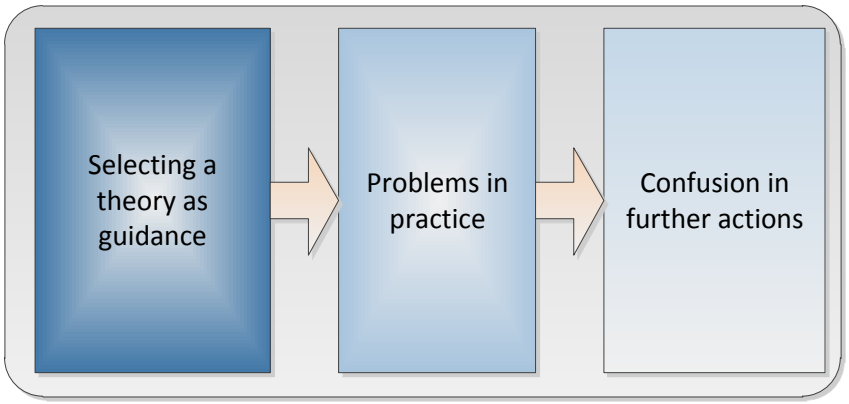


Figure 45. Using theories as a guidance to practice

Figure 45 shows how confusion occurs when a theory is applied as the guidance to the practice. When a theory is selected as guidance, problems can exist in the practice. How to solve the problems becomes a new question. As the problem is caused under the application of a theory, there will be no solution to solve those problems by relying on the selected theory.

To address the problem, theories should be critically selected and applied for better performance. Within DE practice, the nature of DE, the relevant influences on learning, educational objectives and the knowledge of learners all need to be considered in pedagogical design. In other words, the design of DE should be based on 'what needs to be done' rather than 'what the theory is'. Therefore, what guides the design of DE should be what needs to be

considered in distance learning, such as the nature of DE, the educational objectives, and the features of learners. Pedagogy is the design of what can be done to achieve effective learning based on those aspects. During the process of DE operation, particular theories can be applied when a problem occurs. Theories, therefore, should be critically selected and applied for the improvement of DE practice. This approach to the relationship between theories and practice is illustrated Figure 46.

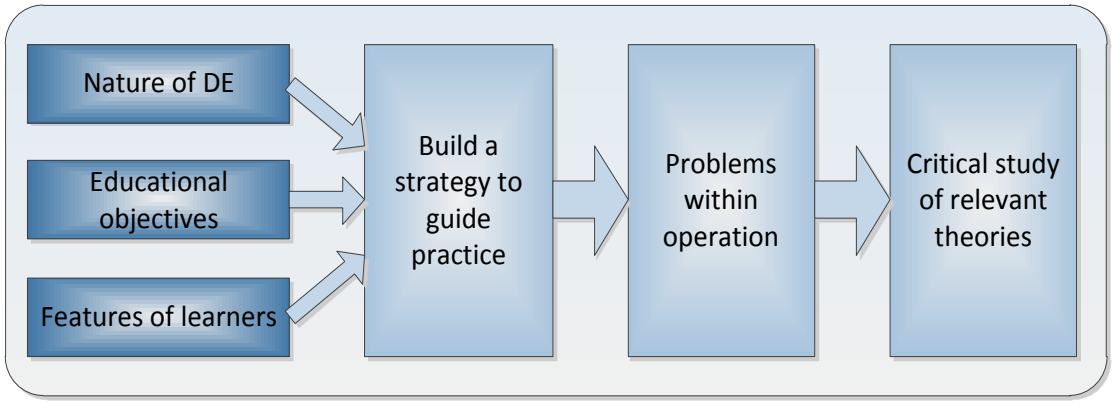


Figure 46. Proposed approach of the relationship between practice and theories

Referring to Figure 46, the practice of DE delivery firstly needs a strategy which should be built based on the nature of DE, the educational objectives of the particular level in particular field of study, and the features of learners. Learners and their learning experience are unknown to the educationalists. This study suggests that the development of pedagogy needs to examine the student learning experience. The unreliability of other factors has been established based on the survey findings, which show that students' feedback is not reliable in improving DE operation and high marks do not necessarily represent learning effectiveness. Therefore, the best guidance to theoretical development is how students learn in their own experience.

Next section will discuss how DE delivery should be changed based on the findings of how student learn from the current study.

7.3.2 Discussions of DE delivery at the first stage

7.3.2.1 Introduction to this section

The discussions in the previous section highlight that students' metacognitive capabilities need to be increased and this can be done through improving students' awareness of DE delivery, knowledge of educational psychology and learning strategies. How can institutions achieve this? As emphasised in this thesis, in DE students learn on their own. What institutions can do to contribute to better learning experience is to support the development of

learners' capability to learn. This new approach will guide changes of pedagogical design in DE, which considers the main elements of DE in each stage of DE delivery (see Figure 47).

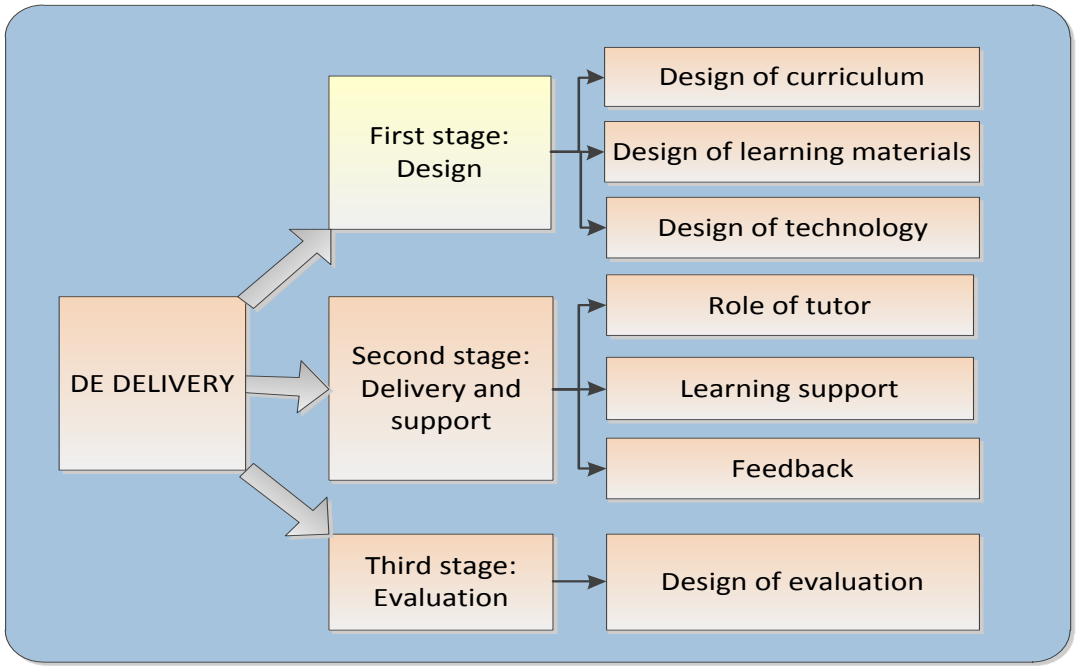


Figure 47. Illustration of the issues considered in DE delivery

As shown in Figure 47, issues considered for the first stage of DE delivery include design of curriculum, design of learning materials, and design of technology. Those addressed in the second stage of DE delivery include the role of tutors, learning support and feedback. The issue considered in the third stage of DE delivery is the design of evaluation. These proposed changes in regard to these aspects are now discussed step by step.

7.3.2.2 Design of the curriculum

As discussed in Section 7.2.3.1, self-awareness of DE delivery, cognitive efficiency and theory of learning are required to improve student learning capability. This is achievable by expanding the curriculum. Emphasising knowledge of relevant theory as part of the curriculum will support 'self-teaching'.

The data findings in this study have shown the importance of learning style, the function of the human brain, influence of psychological dynamics. An understanding of the knowledge related to these issues can improve students' learning capability. In other words, the absence of psychological management in DE and its impact on difficult experiences can be solved by study of the theory of teaching and learning.

7.3.2.3 Design of learning materials

Based on the discussions of student learning experience and pedagogical improvement, the design of learning materials needs to provide the directions for reading, the materials must be designed psychologically and learning activities of the adults have to be considered. Firstly, lack of direction in reading indicates the importance of guidance in reading activities. Providing the appropriate guidance will contribute to improving students' awareness of what should be read and how to read it. The design of the direction of reading learning materials and the direction of engagement are important. This will also allow the use of strategies for effectively completing reading. Second, psychological design in guiding the reading process is important. Learning materials have the function of teaching in DE. It is not only about the content; it is also about cognitive activity during the reading process. Design of the materials is also the design of teaching. Educational psychology, which is normally considered in teaching activities, needs to be applied in the design of materials. Lastly, in considering the needs of adult students at postgraduate level, design of learning needs to consider the length and amount of materials. Distance learners read the materials differently from conventional students, who are guided by seminars and lectures. Lack of direction produces more stress and difficulties in the reading process. The appropriate amount of reading for distance learners must be considered.

7.3.2.4 Design of the use of technology

Based on the needs of improving student awareness of DE, this study suggests that institutions need to support learners by providing knowledge of how to use technology; and to deliver modules consistently in order to reduce potential distractions. Instead of encouraging interaction in using technologies, the study suggests that improving student awareness of technology with the development of cognitive ability will significantly support learning. This will allow students to make informed decisions when selecting the use of technology to suit their demands.

In considering cognitive efficiency, the data show that the role of using technology in DE involves far more than bridging the gap between teaching and learning. It is also effective in combining different activities of learning, using both left and right sides of the brain and at the same time improving the efficiency of time spent on learning by using a variety of learning resources. The huge potential of the role of technology explored in students' learning experience provides new guidance for improving the use of technology in DE.

In addition, to understand the learners and their learning habits is a basic necessity in the design of technologies. Students' ability to use technology varies. For students who do not have strong ability in this area, applied technology can produce extra stress. Therefore,

awareness of the learners and their learning habits are an essential factor in the design of technologies.

7.3.3 Discussions of DE delivery at second stage

7.3.3.1 The role of tutors

In order to develop students' metacognitive capability, the instructors are responsible for equipping them with the knowledge of reflective, self-directed and self-regulated learning. Based on existing theory, which recognises tutors as 'monitors' and 'facilitators', this thesis prefers the instructors in distance education at postgraduate level to be considered to be 'personal development guides'. The instructors are responsible for providing the knowledge of how to learn and giving students opportunities to learn from each other.

Metacognition is about students' perspectives on coping with the situations, as well as their willingness and ability to take action. Learning at postgraduate level requires the ability to be critical and independent and learning in DE requires strong feelings of self-contribution. In other words, learners learn based on their own willingness and actions to take self-responsibility. Alternatively, institutions are not capable of managing the self-learning experience. Therefore, tutors need to be 'democratic' in encouraging different learning actions, giving freedom to students to learn in the way they preferred.

7.3.3.2 Innovation of learning support

This thesis argues that, instead of applying the theory of interaction as a theoretical principle to guide the design of learning support, interactions should be considered as one way to facilitate learning support. A new approach is suggested in this thesis: using interaction as part of learning support. This approach is contrasted with the existing approach, in that it has a more active role for interaction (see Figure 48, below).

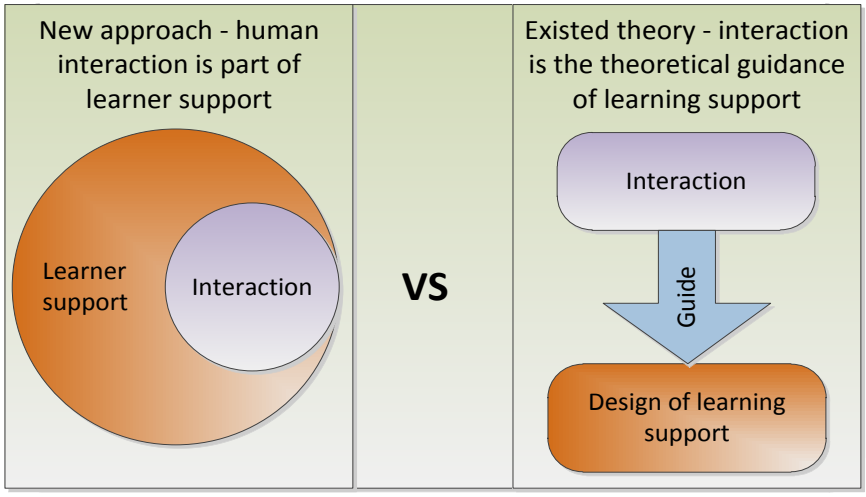


Figure 48. Illustration of the relationship between theory and practice

The left part of the model (as illustrated in Figure 48) is the proposed new approach, which prefers that human interaction is part of the learner support. On the opposite side, existing theory prefers that interaction should be one of the theoretical guidance in designing learner support. This thesis argues that students' independent learning experience and their engagement of dealing with difficulties were not considered enough because of the 'iceberg' of relevant knowledge. The new approach encourages more contributions on learning support rather than overemphasize interactions.

In addition, students themselves need to be proactive in accessing the learning support that is available in the system. Effort is needed to make the provision of learning support valuable. The students need to be aware of the support provided, as this will allow them to use it appropriately: otherwise, there is no link between the provision of learning support and learning actions. Therefore, the design of support, the method of provision and interactions are all important for the value of learning support.

Furthermore, learner support is the support provided to learners for their needs of learning effectiveness, for example, in dealing with difficulties. The design of learning support, therefore, should include methods to reduce difficult experiences and solve learning problems. The issues in complex learning environments need to be understood by the designers if a reasonable design for learning support is to be achieved. This thesis argues that an open mind is essential for the design of learner support which should be able to allow the inclusion of multi approaches in supporting learners based on their circumstances.

7.3.3.3 The problem of feedback

From the statistical analysis of questionnaires, the biggest problem in DE delivery and students' learning experience appears to be the issue of feedback. . The evidence includes its influences on motivation, high level of difficulties when dealing with feedback problem, lack of learning strategies, and contradictions within student perspectives. On one hand, students are aware of the need for self-responsibility in DE. Most participants stated that they do not rely on tutors' comments and feedback. On the other hand, they have certain expectations. The negative influences of feedback problems on students' emotions and motivations were clear from the study. One solution to these problems is the use of alternative strategies developed by some participants, for example, finding the answers from learning content; learning from senior colleagues; and using virtual learning environment.

Based on the emergent problem, this thesis argues that being aware of the nature of DE also includes what can be done in DE compared to conventional education. Student expectations of feedback have often developed during their previous learning experience, which is mostly

from conventional education. The mismatch between their expectations and the nature of DE only produces more negative feelings and reduces students' self-contribution.

To help students understand the nature of DE and to develop appropriate expectations of feedback is important for most students who expect feedback to be the same as in on-campus education. In addition, provision of alternative support which can partly replace the function of tutor feedback is recommended. The finding that students who do not use English as first language have a higher ability to deal with feedback problems is evidence of the possibility of solving feedback problems through developing appropriate perspectives and alternative solutions.

7.3.4 Discussions of DE delivery at third stage

Use of learning strategies in preparing for assessment and assignments shows students' efforts in self-direction, self-regulation and cognition. Assessment and assignments appear as guidance in directing their learning, deep and critical thinking, and reflective learning. This thesis recommends that the role of evaluation should be expanded into the design of the questions. How to design evaluation as a tool to direct distance learning is an important function of learning activities. For assessment and assignments the role of guidance is possibly more important than that of evaluation. How this can be properly designed is a difficult challenge for instructors.

In addition, distance learners and on-campus students do have different strengths and weaknesses in understanding and critically applying knowledge. Based on the differences between distance education and traditional education, evaluations at postgraduate level need to be re-thought. An appropriate evaluation of distance learning would need to consider the strengths of DE, which will guide students' work in an appropriate direction; otherwise, distance learners will not be able to focus on what they really need to learn.

7.3.5 Summary: recommendations to DE delivery

In summary, the recommendations for the first stage of DE delivery include:

(i) Integrating the knowledge of 'teaching and learning' into the curriculum in order to allow self-teaching be effective; this is recommended as the knowledge of educational psychology and theory of learning;

(ii) Designing learning materials psychologically, such as providing directions for reading and cognitive effectiveness. Also the length of reading needs to consider the features of adult learning.

(iii) The role of technology in cognitive efficiency and students' ability in using technology are suggested to be included in designing the use of technologies.

In the second stage of DE delivery, recommendations include:

(i) Tutors should be the guider of personal development. More efforts to enhance ability development and less control of learning activities are recommended for the role of tutors.

(ii) Interaction should be one way to support learning. It should be a theoretical guidance in designing support systems because interaction is an option of learning strategies, not a compulsory engagement for all students.

(iii) Feedback problems are produced by the nature of DE. Providing expected feedback is beyond institutional capability. To help students be aware of this issue is the way to improve self-contributions.

In the third stage of DE delivery, the role of evaluation need to be rethought based on the characteristics of DE. The role of guiding learning direction is recommended for inclusion in the design of evaluation.

7.4 Proposed combination of three generations of DE pedagogy

Referring to the discussions above, DE delivery needs to ensure the quality of higher education through enhancing student learning capability. This should be a guideline of selecting appropriate pedagogies. The pedagogical influences on students' experience have been illustrated in Table 5 on page 72. In order to design appropriate pedagogy for positive learning experience, proposed DE pedagogy is discussed based on the problems shown in Table 5. The applied pedagogy impacts on learning experience through role of tutor, learning support and use of technology (see Section 2.3.2). These items need to be modified based on the findings of this study before the discussions of pedagogy. Firstly, teaching presence in distance learning experience is related to all of the institutions' activities (see Section 4.2.4), the 'role of tutor' should therefore be redefined as 'role of relevant staff'. In addition, although use of technology is part of learning support, its actual role on learning is in fact more than bridging the gap between teaching side and learning side (see Section 7.2.3.4). Therefore, the main factors which impact on student experience are updated as: role of relevant staff, learning support and use of technology.

The idea of appropriate pedagogy in DE is the combination of three generations of DE pedagogy (see Section 2.2). The pedagogies which are proposed to be adapted in different stages of DE delivery are suggested in order to guide the proposed changes on role of relevant staff, learning support and use of technology. Different combinations of DE pedagogy are recommended for guiding positive learning experience in six groups of learning activities (see Table 63).

Table 63. Proposed combination of three generations of DE pedagogy

Pedagogical approach		Combining three generations of DE pedagogy		
Pedagogical application on DE practice		The role of relevant staff	Learning support	Use of technology
Considering pedagogical influences on six groups of main learning activities	Reading learning materials	Designing the content and length of materials	Main point guidance and psychological design	Different styles of reading and wider content
		Suggested pedagogy: cognitive-behaviourist theory		
	Understanding learning content	Designing the levels of difficulty in learning content	Main point guidance, psychological design, encouraging reflective learning	Encouraging different styles of cognition
		Suggested pedagogy: cognitive-behaviourist theory and social construction		
	Seeking support	Communications with students, Supporting other kinds of interactions	Providing knowledge to enhance learners' ability; providing support system for learners	Allow online interactions and fulfilment of knowledge by learners
		Suggested pedagogy: connectivism and social construction		
	Using technology	Communications, problem solving,	Allowing knowledge fulfilment for peer support	Consistent between modules; considering differences between individual abilities
		Suggested pedagogy: connectivism and cognitive-behaviourist theory and constructivism		
	Dealing with feedback problems	Managing the time to responding student questions and suggestions for self-learning	Knowledge of how DE is different from on-campus learning; Providing options for self-support	Allowing research from online resources
		Suggested pedagogy: cognitive-behaviourist theory and connectivism		
	Preparing for evaluation	Evaluating DE based on its feature	Knowledge of strategy	Delivery, submission and communication
		Suggested pedagogy: cognitive-behaviourist theory and social constructivism		

As shown in Table 63, six groups of learning activities are impacted by the applied pedagogy. Combination of three generations of DE pedagogy therefore is designed based on the findings of this study.

Firstly, cognitive-behaviorist theories need to be studied whilst designing the reading materials. For example, the length of the materials and main point guidance need to be considered based on students' learning styles and the situation of distance leaners. Psychological design of learning support is essential at this stage. Secondly, cognitive behaviorist theory needs to be applied in designing learning content in terms of its level of difficulties. Also, Encouragement of reflective learning should be guided by the theory of social constructivism. Thirdly, combination of the theory of connectivism and social constructivism is suggested to help students effectively seek support. For instance, relevant staff should engage in communicating with students and also support other kinds of interactions and online knowledge fulfillment is a suggest way to support learning. Fourthly, combination of three generations of DE pedagogy is recommended to the use of technologies. Cognitive-behaviorist theory is guidance for designing the online materials and the role of information technology in providing a platform for knowledge development can be guided by the idea of connectivism. In addition, use of technology should consider the different ability between individuals and their psychological dynamics caused by using technologies. In addition, combination of cognitive-behaviorist theory and connectivism is suggested in regard to the feedback problems. Students need to develop their perspective on lack of feedbacks in DE. The institutions on one hand need to provide the knowledge of how DE is different from on-campus learning, on the hand need to manage the limited capability to respond on students' questions. This requires theory of cognitive-behaviorist theory. It will be also positive to learning success if knowledge development in online system can provide answers from one student to other students. Finally, a combination of cognitive-behaviorist theory and social constructivism is suggested for preparing evaluations. Cognitive-behaviorist theory is suitable whilst preparing for the evaluations such as the theory of cognitive styles, learning styles and knowledge of how to achieve cognitive efficiency. In addition, social constructivism approach is valuable for students to take self-learning responsibility in the specific environment.

In summary, this section provides a solution to combine three generations of DE pedagogy. The proposed combinations in Table 63 are recommended as a strategy for achieving learning effectiveness at postgraduate level in the Built Environment.

7.5 Conclusions

7.5.1 Pedagogical change based on how student learn

In conclusion, this thesis explores the main issues of the distance learning experience. These include lack of direction in learning, difficulties in regulating the learning process and weakness of cognitive knowledge among learners. The study reveals that the function of on-campus education involves more than merely the teaching of knowledge. How to learn effectively is designed into the teaching process and guided by the instructors. In DE, when distance learners become active in self-teaching, those functions of education change. Hence, students have to develop their own strategies to deal with different situations for their learning effectiveness. Distance learners thus need to develop their metacognitive capability during the process of dealing with difficult experiences. This thesis highlights the factor that relevant pedagogy needs in order to encourage the development of metacognitive capability. This can be achieved through improving students' awareness of DE programme, as well as their knowledge of educational psychology and learning strategies. Change of DE pedagogy in order to improve metacognitive capability need to be addresses into the main elements of distance learning environment into each stage of DE delivery. This can solve the problem of dropout and improve the quality of higher education in DE. The detailed discussions of pedagogical design in this thesis in fact combine the ideas of three generations of DE pedagogy. It is a major precept of this thesis that encouraging effective learning must include appropriate combination of three generations of DE pedagogy.

7.5.2 Innovation of the perspectives on DE

At the end, this thesis highlights and provides solutions to some of the basic of problems of DE. It is the lack of priority given to DE that restricts its development. Based on the research findings the basic causes of this lack of priority to DE are both internal and external. Internally, the effort in providing an alternative to the classroom learning environment at postgraduate level is not appropriate and it tends is to produce disappointment on both teaching and learning sides. Externally, DE has its advantages and disadvantages. When the associated quality of education is challenged because of its lack of communication, its advantages are less clear.

This thesis also highlights a potential advantage of distance learners over students in conventional education, i.e., that distances learners become more capable of lifelong learning. The rapid changes of modern society require individuals to have this capability. Evidence of the strengths of distance learners has been provided in this thesis. Therefore, a review of the social function and expectations of DE is suggested. This would be the start of developing DE based on its own characteristics (which differ from those of traditional education). The

recommendations for DE development in this thesis will allow enhancement of the advantages of distance learners and the quality of higher education. For the industries which require employees to have high capability in continuous learning, distance learners may become the first preference, rather than the second.

In short, development of DE needs to be undertaken according to what it is, rather than how can it be as 'good' as traditional education. Its advantages in producing higher lifelong learning ability should be realised by educationalists when designing pedagogy, and by wider society to change their perspective of DL as 'the second preference'.

7.6 Limitations and recommendations

7.6.1 Limitations and recommendations to further research

The outcomes of current study contribute to developing pedagogy for improving student capability in taking their own responsibilities. The limitations of the study require identification and discussion.

Firstly, the findings were not able to address the extent which cultural background, students' perspectives and their learning styles impact on learning capabilities because this was not the focus of this study. Further research therefore needs to address the influences of these factors on metacognitive learning experience. The *Framework of Distance Learning Experience* is recommended to these investigations in the further research.

Secondly, the instrument developed in this study is not able to evaluate student experience within any single module: it is a tool to evaluate the overall experience of distance learning. Accordingly, this thesis is not able to identify differences of students' performance between modules. This needs to be aware in further research.

Thirdly, the learning strategies which are developed in this study are the knowledge of how students can deal with the difficulties in DE at postgraduate level in the Built Environment. As discussed within this thesis, creativity in selecting and combining different strategies to match particular situations is important. Further research need to investigate how these strategies can be adopted and developed by students in other fields.

Fourthly, as the majority of learners in this study like flexibility of distance learning, have an internal locus of control, and are interested in the provided credits, the influences of these factors on learning experience which were previously discussed as main issues of distance learning do not appear in the current study. This is realised as the features of learning experience in the sixth type of DE. It would be interesting to know the features of the learners in other fields and to explore their learning experience. Further research needs to compare the

differences between the Built Environment and other fields. The combination of three generations of pedagogy in different field of DE can be critically designed based on the outcomes of this study.

Finally, a distance learning experience questionnaire was produced and developed for the research into what and how learning strategies are used by distance learners at postgraduate level. The numbers and detail of responses to the open-ended questions declined as the questionnaire progressed, suggesting that fewer items would be more suitable for collecting both qualitative and quantitative data from students who have limited time. This is considered in two aspects, (i) because the findings in both initial case study and questionnaire research suggest that there is no particular strategy which can fit all learners in all situations, the illustrated strategies are cancelled from the original questionnaire; (ii) the correlations analysis suggests some factors of learners' features are less significant in analysing the experience of distance learning. These items could also be reduced or omitted in future surveys. The modified distance learning experience questionnaire includes 58 items in total, which is 26% short than the original version and, therefore, it is recommended for further research to collect mixed data (Appendix 12).

7.6.2 Reflection on how to do social research

The advantage of mixed methods is emphasized in this thesis. When the research is conducted qualitatively, it is very important to take into account those who did not speak. Quantitative data provide an opportunity to see the whole picture. 'The forest could not be seen when a leaf covers your eyes' (traditional Chinese philosophy). The experience of undertaking this study has highlighted the advantages of mixed methods in social research for its validity and reliability. A review of the philosophical foundation of social research hence appears at the end of current study. This thesis has provided the details of research methodology which shows that the driver of this study is a combination of ontology and epistemology. By respecting the existence of social scenario, research efforts have been made in relation to its causes, what it is, its impacts on social surroundings and dynamics along with the relevant factors. From the experience of implementing each of the stages involved in completing this study, it has become clear that a paradigm for conducting a social research study is formed based on the knowledge of the problems and relevant issues in reality. There is no 'one-fit-all' approach to successful social research. Pragmatic design and operation of research project are a concept which requires understanding of the problems, design of appropriate research strategy, and flexibility in managing uncertainties.

Appendices

Appendix 1. Research participant consent form

Name of participant: .....
Organisation: ..... (if applicable)
Project title: .....
Researcher's name: .....
Programme of study: .....
Supervisor's name: .....

Standard statement of participant* consent

I confirm that
I have been briefed about this research project and its purpose and agree to participate* ☐
I have discussed any requirement for anonymity or confidentiality with the researcher** ☐
I agree to be audio taped / videotaped during the interview ☐

* *Participants under the age of 18 normally require parental consent to be involved in research.*
** *See the section below for any specific requirements for anonymity or confidentiality*

Signed ..... **Date** .....

Specific requirements for anonymity or confidentiality

Standard statement by researcher
I have provided information about the research to the research participant and believe that he/she understands what is involved.

Researcher's signature .....
Date .....

Appendix 2. Communication record form

Date	**Communication content** (see info below 1-7 for classification)	**Form of communication**	**Time** (length of call)

Codes for communication content:

1. Accessing online materials; 2. Understanding learning content; 3.Problems about online communication; 4.Self-assessment tasks; 5. Assignment; 6.individual issues; 7. Others

Appendix 3. Focus group guidance

Guidance for group discussion

This group exercise is to explore your distance learning experience and factors which influence your level of motivation and effective study time. It provides opportunity to exchange experience and explore learning skills for distance learners. This data are being collected for a PhD research project which aims to improve the quality of distance education.

Note: could each group please appoint a reporter to chair discussion and formally record comments which will be used for preparing group presentation.

Discussion topics

1. Explore the positive experience; i.e., the things which worked well for you. For example: how do you read the learning materials; what do you do for preparing for evaluation; what did you do when you have questions; how do you manage your time; etc.

Note: please use form A for recording.

2. Explore the difficulties which you experienced/are experiencing in the distance learning process;
3. How these difficulties affect your emotions; and how your feelings impact upon your learning;
4. Discuss the learning strategies you have developed in dealing with the difficulties you have identified.
5. Suggest possible institutional supports which need to be applied to deal with the difficulties.

Note: please complete form B during the discussion of topics 2-5.

Group presentation

Please prepare a 2-5mins presentation to present the issues discovered in your group discussion which involve: 3-5 most important difficulties in your learning experience; positive experiences or learning strategies which you want to share with the other groups; how important emotion/motivation is to distance learning; how to be an effective/successful/happy learner.

Appendix 4. Learning Experience Record Form A

Form A: My experience in effective distance learning

Recording initial thoughts	More records following further discussion

Appendix 5. Learning Experience Record Form B

Form B: Difficulties in learning experience record

Please state the particular difficulty	The reason which is causing the difficulty	How does this affect my emotion	How do my emotions effect my learning activities	My strategies in dealing with the difficulty	Suggested ideas of support

Appendix 6. Invitation letter for experts participating in pilot study

Dear ***,

I am currently undertaking doctoral research into distance learners' experience in using strategies in autonomous learning at postgraduate level. I have read your publications and appreciate your knowledge and expertise in open and distance learning.

Based on a pilot case study, I have designed a questionnaire for a social survey. The objective of the survey is to measure the level of self-awareness of learning and the use of learning strategies based on the students' self-report. Data will be collected from current distance students in the Built Environment field.

The outcomes of this research project will attempt to contribute to developing distance education pedagogy, designing distance learning delivery and suggesting potential further research of educational psychology in distance learning.

I am currently modifying my questionnaire design and would be most appreciative of your comments as acknowledged experts in the field. Could you please read the attached draft and provide appropriate comments to help me to improve the quality of my social survey and to achieve higher quality research outcomes.

Thanks in anticipation,

Yours sincerely

Shuting Guo

PhD student

The School of the Built and Natural Environment

Northumbria University

01912274301

Appendix 7. List of experts consulted in the pilot study of the questionnaire

1. Dr Paulo Charles Pimentel Bótas – ICHEM (International Centre for Higher Education Management), School of Management, University of Bath
2. Dr Terumi Miyazoe, Associate Professor, Tokyo Denki University
3. Minna Nummenmaa and Lauri Nummenmaa, University of Turku, Finland, Centre for Learning Research
4. Ormond Simpson, Fellow of the Centre for Distance Education, University of London
5. Dr. Shailey Minocha, Department of Computing, The Open University, UK
6. John T.E. Richardon, The Open University, UK
7. Patricia McGee, The University of Texas at San Antonio
8. Dr Robert M. Carini, Associate Professor, Department of Sociology, University of Louisville
9. Jamie Tompson, Northumbria University
10. Jacquie McDonald, University of Southern Queensland
11. Sofie Loyens, Department of Psychology, Erasmus University Rotterdam, The Netherlands

Appendix 8. Letter to institutions

Dear Sir/Madam,

I am writing to invite students from your distance learning programmes to take part in a research of distance students' learning experience:

http://www.surveygizmo.com/s3/416834/Distance-Learning-Experience-Survey

This is a doctoral research which is exploring the use of learning strategies in students' distance learning experience. Students in your programme are welcome to ask for a report of the research outcomes to assist in developing their learning.

A welcome letter is included at the beginning of the questionnaire to further explain the purpose of this research and data protection.

Your support is much appreciated.

Yours sincerely

Shuting Guo

PhD student

The School of the Built and Natural Environment

Northumbria University

Email address: shuting.guo@northumbria.ac.uk

Tel: 01912274301

Appendix 9. Brief outline of the questionnaire

Brief outline:

Research of distance learning experience at postgraduate level

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Background of this research and design of questionnaire

This research aims to critically appraise distance learners' learning experience for pedagogic development. In distance education, learners complete their learning process by a flexible arrangement of learning activities. They learn in their own environment and have the responsibility for their own learning. The knowledge of how and to what extent students are taking this responsibility is significant for developing pedagogic design of distance education. Based on a case study of distance education in the Built Environment, a questionnaire named as 'Distance Learning Experience Survey' was designed to collect both qualitative and quantitative data through survey research. 78 questions are designed into three parts: background information (which is used to categorise individual differences), learning experience (which is used to evaluate the level of students self awareness, experiences, contribution to strategic learning, motivation and self-evaluation), and open comments. It will take approximately 10 -15 minutes to complete.

Data analysis and participants selection

The data will be used to analyse the difficulties experienced by students, the influence of motivation and use of learning strategies. In addition, the findings will be able to show how relevant factors (such as, locus of control, previous learning experience, and experience of distance learning) affect students' capability in using learning strategies. Participants selected are students currently studying by distance learning at postgraduate level. These students are selected from several institutions incorporating the discipline of the Built Environment and several other disciplines.

Institution involvement

This is an online survey involving students from several institutions. The identity of institutions will not be recognised in data analysis. A report of findings of the survey research will be distributed to the involved institutions.

The distance learning experience survey is online through:

http://edu.surveygizmo.com/s3/416834/Distance-Learning-Experience-Survey

Acknowledgement

To achieve a good sample size and to ensure the identity of participants (current distance students at postgraduate level) is essential for the quality of this research. I sincerely appreciate the great support from you and your institution. Thanks.

Shuting Guo

PhD student, School of the Built and Natural Environment, Northumbria University

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Principle supervisor:

Professor David Greenwood, School of the Built and Natural Environment, Northumbria University

david.greenwood@northumbria.ac.uk

Appendix 10. Distance learning experience questionnaire

Distance Learning Experience Questionnaire

Welcome

This questionnaire is designed for a PhD research project which aims to contribute to an effective distance learning experience for students from a range of different backgrounds. This questionnaire has been designed to allow you to describe, in a systematic way, your distance learning experience (feelings, use of strategies and motivations). This will help to improve distance education delivery based on students' learning experience. It is important that you respond truthfully so that your answers will describe your actual ways of studying. It will take approximately 10-15 minutes to complete.

All data provided will be strictly confidential and your participation will be much appreciated. You have the right to participate, to refuse, or to withdraw at any time.

Please read the statement below and confirm your willingness to participate if you are interested. If you have any questions, you are welcome to contact the researcher at the email address provided.

Thanks for your collaboration!

Shuting Guo
The School of Built and Natural Environment
Northumbria University
Email: shuting.guo@nortumbira.ac.uk

Please confirm your agreement of participation

I understand the purpose of this research and agree to participate. I also agree the data collected from me, may be held securely and confidentially and will be used for the purposes of research only.

Please select 'Next' to continue the survey; or select 'Back' if you are not interested (this is for online system).

Part one: Background information

1) Within which subject area are you studying?

( ) Built Environment ( ) Business ( ) Law ( ) Computing ( ) Art and Social Science

( ) Design ( ) Health and Education ( ) Other

2) What level is the programme you are studying?

( ) Foundation level ( ) Undergraduate level ( ) Postgraduate level

3) Does the programme you are studying provide credits for any professional qualification?

( ) Yes ( ) No ( ) Unsure

4) Are you interested in applying for professional qualifications using the credits obtained from this course?

( ) Yes ( ) No ( ) Unsure ( ) Not applicable

5) The reason for you studying by distance learning is:

_____

6) How long have you been involved in the distance learning programme on which you enrolled?

( ) 6 months or less ( ) 6-12 months ( ) 13-18 months ( ) 19-24 months ( ) longer

7) How long have you been involved in distance learning (including your previous experience if you have any)?

( ) 6 months or less ( ) 6-12 months ( ) 13-18 months ( ) 19-24 months ( ) Longer

8) The maximum hours that you spent on distance learning per week: _____

9) The minimum hours that you spent on distance learning per week: _____

10) The average hours which you spent on distance learning per week: _____

11) The average mark that you typically attained is:

( ) Under 40 ( ) 40-49 ( ) 50-59 ( ) 60-69 ( ) 70-79 ( ) 80 and above

12) How well do you think you're doing on your distance learning programme, based on your satisfaction with the knowledge you obtained and your learning experience (NOT your marks)?

( ) Very well ( ) Well ( ) So-so ( ) Not well ( ) Not very well

13) What is your gender? ( ) Male ( ) Female

14) Please select a relevant category for your age:

( ) Under25 ( ) 25-34 ( ) 35-44 ( ) 45-54 ( ) 55 and over

15) Is English your first language? ( ) Yes ( ) No

16) What is the highest qualification which you currently hold?

( ) Graduated high school or equivalent ( ) Some college, no degree ( ) Associate degree

( ) Bachelor's degree ( ) Postgraduate diploma ( ) Post-graduate degree ( ) Doctoral degree

17) In which country did you study for your previous highest qualification/degree (please select the one you spent most of the time if you studied in more than one country)?

_____

18) In which country did you study for your basic education (primary and secondary school, for example)? Please select the one you spent most of the time if you studied in more than one country.

_____

19) Do you have domestic responsibility, for example, looking after children, elders?

( ) Yes ( ) No

Part two: learning experience

Overview of distance learning experience

20) I felt isolated whilst learning at a distance.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

21) When learning, I was easily distracted.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

22) I sought an appropriate environment for effective learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

23) I organised my study time carefully to make the best use of it.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

24) I set clear goals in distance learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

25) I checked my progress in achieving learning goals.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

26) I believe that success in learning mainly depends on my own effort.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

27) I like the flexibility of distance learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

28) Interaction with tutors helped my learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

29) Interaction with my peers helped my learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

30) Interaction with my friends and colleagues helped my learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

About reading learning materials

31) I knew what I was supposed to read.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

32) It was difficult for me to finish the amount of reading required.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

33) I was fully motivated to do the reading.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

34) I printed out online materials to read.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

35) I skimmed the materials and focused on some particular points for reading.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

36) I completed what I was supposed to read.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

37) I still need to learn how to read faster and more effectively.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

38) The strategies which I used for effective reading also include (please write in):

_____

About understanding the content of learning materials

39) I was clear about what I was supposed to learn.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

40) It was difficult for me to understand learning content on my own.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

41) I was fully motivated to work on understanding learning content.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

42) I made connections to what I already know for better understanding.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

43) I related learning content to practical or real life contexts.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

44) I understood the learning content which I was supposed to learn after completion of the subject.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

45) I still need to know how to understand the learning content more effectively.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

46) The strategies which I used to understand learning content also include (please write in):

_____

About seeking learning support

47) I knew what support I could get from the programme.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

48) I got support when I communicated my learning needs to the relevant staff in the program.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

49) I was motivated to communicate with the staff when I needed support.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

50) I sought support from other students.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

51) I sought support from colleagues.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

52) I sought support from friends and/or family members.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

53) I solved problems in learning by seeking support.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

54) I still need to learn how to seek more support for learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

55) The strategies which I used to seek more support for my learning also include (please write in):

_____

About use of information technology (IT)

56) I understood the purpose of using information technologies in my programme.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

57) It was difficult for me to use technologies provided by the distance learning programme.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

58) I was fully motivated to use technologies for better study.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree ( ) Not Applicable

59) I have learned skills in technology for more effective study.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

60) I embraced additional technologies in my study (apart from what have been provided in the distance learning system).

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

61) The use of technologies was significant for my learning efficiency.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

62) I still need training sessions to improve my IT skills.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

63) The strategies which I used to improve the use of technology also include (Please write in):

_____

About influence of tutors' comments and feedback

64) I rely on tutors' comments to evaluate and improve my learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

65) I normally got feedback on time.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

66) The feedback I obtained was what I expected.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

67) I could maintain motivation even if I did not get feedback and comments.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

68) Please state what feedback and tutor's comments mean to you in developing learning:

_____

69) I developed my own strategies for learning effectively when I could not obtain feedback and/or could not get it in time.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

70) The strategies which I used for effective learning when I could not obtain feedback were (Please write in):

_____

About assessment/assignment

71) I understood the assessment/assignment questions.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

72) In general, I found the assessments/assignments difficult.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

73) I was fully motivated to work for the assessments/assignments.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

74) I developed a plan for working on assessment/assignment.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

75) I started to prepare assessment/assignment early rather than leave it until the last minute.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

76) I was satisfied with my marks.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

77) The strategies which I used for preparing assessments also include (please write in):

_____

Part three: Open comments

78) The last question gives you the opportunity to highlight any specific distance learning strategies which have not been included in the previous questions. And please state how effective they are in supporting your learning.

Thank you very much for your time in completing this questionnaire. It is very much appreciated.

Thank You!

Appendix 11. Codebook

Codebook

(Distance learning experience questionnaire)

Order	Variable	SPSS variable name	Coding instructions
1	Identification number	ID	Number assigned to each participant
2	Subject	Subject	1 = Built Environment 2 = Business 3 = Law 4 = Computing 5 = Art and Social Science 6 = Design 7 = Health and Education 8 = Other 99999 = Missing data
3	Level of distance learning	Level	1 = Foundation level 2 = Undergraduate level 3 = Postgraduate level 99999 = Missing data
4	Provide professional credits	PrCredits	1 = Yes 2 = No 3 = Unsure 99999 = Missing data
5	Interesting in professional credits	Intercred	1 = Yes 2 = No 3 = Unsure 4 = Not applicable 99999 = Missing data
6	The first reason for studying in distance learning	1st ReaStu	0 = no reason 1 = Employment 2 = Knowledge and skill improvement 3 = Family responsibility 4 = Geography 5 = Career development 6 = Sponsored by the employer 7 = Knowledge application in developing experience 8 = Particular education needs 9 = Needs of credits for professional qualification 10 = Financial advantage 11 = Keep me busy 12 = Needs of degree 13 = Personal development 14 = Flexibility and

			continence 99999 = Missing data
7	The secondary reason for studying in distance learning	2ndReaStu	0 = No second reason 1 = Employment 2 = Knowledge and skill improvement; 3 = Family responsibility 4 = Geography 5 = Career development 6 = Sponsored by the employer 7 = Knowledge application in developing experience 8 = Particular education needs 9 = Needs of credits for professional qualification 10 = Financial advantage 11 = Keep me busy 12 = Needs of degree 13 = Personal development 14 = Flexibility and continence 15 = Promotion 16 = Unexpected data 99999 = Missing data
8	The third reason for studying in distance learning	3rdReaStu	Same as above
9	Employment as the reason for choosing DE	Employment	1 = Yes 2 = No
10	Time involved in current programme	TiminPro	1 = 6 months or less 2 = 6-12 months 3 = 13-18 months 4 =19-24 months 5 = longer 99999=Missing data
11	Time involved in distance learning	TiminDE	1 = 6 months or less 2 = 6-12 months 3 = 13-18 months 4 = 19-24 months 5 = longer 99999 = Missing data
12	maximum hours per week in learning	Maxhous	The number of action hours 99999 = Missing data
13	Minimum hours per week in learning	Minhous	The number of action hours 99999 = Missing data
14	Recoding minimum hours per week in learning	RecoMinhous	1 = 0 hours 2 = 1-4 hours 3 = 5-9 hours 4 = 10-14 hours 5 = 15-19 hours 6 = 20 hours and above
15	Average hours per week in	AveHors	The number of action hours

	learning		
16	Average marks	AveMarks	1 = Under 40 2 = 40-49 3 = 50-59 4 = 60-69 5 = 70-79 6 = 80 and above 99999 = Missing data
17	Satisfaction on obtainment	SatObt	1 = Very well 2 = Well 3 = So-so 4 = Not well 5 = Not very well 99999 = Missing data
18	Gender	Gender	1 = Male 2 = Female 99999 = Missing data
19	Age	Age	1 = Under25 2 = 25-34 3 = 35-44 4 = 45-54 5 = 55 and over
20	English is first language	EnFirL	1 = Yes 2 = No
21	Highest qualification	HighestQu	1 = Graduated high school or equivalent 2 = Some college, no degree 3 = Associate degree 4 = Bachelor's degree 5 = Postgraduate diploma 6 = Post-graduate degree 7 = Doctoral degree
22	Country for highest qualification	CoutryHQ	1 = Australia 2 = Belgium 3 = Brazil 4 = Bulgaria 5 = Canada 6 = Denmark 7 = Egypt 8 = France 9 = Germany 10 = Ghana 11 = Greece 12 = India 13 = Indonesia 14 = Ireland 15 = Kazakhstan 16 = Lebanon 17 = Malaysia 18 = Malta 19 = Nigeria 20 = Northern Ireland 21 = Pakistan

			22 = Poland 23 = Russian Federation 24 = South Africa 25 = Switzerland 26 = Trinidad 27 = United Kingdom 28 = United States of America 29 = Venezuela 30 = Zambia 31 = Zimbabwe
23	British or interactional highest qualification	HQBriInte	1 = British 2 = International 99999 = Missing data
24	Country for basic education	CoutryBE	1 = Australia 2 = Belgium 3 = Botswana 4 = Bulgaria 5 = Canada 6 = China 7 = Denmark 8 = Egypt 9 = France 10 = Gambia 11 = Ghana 12 = Greece 13 = Iceland 14 = India 15 = Indonesia 16 = Ireland 17 = Jamaica 18 = Kazakhstan 19 = Lebanon 20 = Malawi 21 = Malaysia 22 = Malta 23 = Mauritius 24 = New Zealand 25 = Nigeria 26 = Northern Ireland 27 = Norway 28 = Pakistan 29 = Poland 30 = Russian Federation 31 = South Africa 32 = Sri Lanka 33 = Trinidad 34 = United Kingdom 35 = United States of America 36 = Venezuela 37 = Zambia 38 = Zimbabwe
25	British or non-British basic education	BrinonBBE	1 = British 2 = International 99999 = Missing data

26	domestic responsibility	DomeResp	1 = Yes 2 = No
27	I felt isolated whilst learning at a distance.	Isolation	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
28	I was easily distracted in learning	Distract	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
29	Seeking appropriate learning environment	EnvirMan	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
30	I organised my study time carefully to make the best use of it	Timeman	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
31	I set clear goals in distance learning.	GoaSet	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
32	I checked my progress in achieving learning goals	GoaChek	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
33	I believe that success in learning mainly depends on my own effort.	LocusContr	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
34	I like the flexibility of distance learning	LikFlex	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
35	Interaction with tutors helped my learning	InteTut	1 = Strongly disagree 2 = Disagree

			3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
36	Interaction with my peer students helped my learning	IntePe	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
37	Interaction with my friends and colleagues helped my learning	InteFre	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
38	I knew what I was supposed to read	AwareReadi	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
39	It was difficult for me to finish the amount of reading required	DiffiReadi	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
40	I was fully motivated to do the reading	MotiReadi	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
41	I printed out online materials to read	PrintMate	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
42	I skimmed the materials and focused on some particular points for reading	SkimMate	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
43	I completed what I was supposed to read	CompReadi	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree

			99999 = Missing data
44	I still need to learn how to read faster and more effectively	NeeReStr	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
45	The first strategy used for effective reading	1st StraReadi	0 = No strategy 1 = Time management and/or environment management 2 = Control reading speed 3 = Main points focus and skimming 4 = High lighting and revert 5 = Note taking and note studying 6 = Using technology to support reading 7 = Finding and following a guidance 9 = Checking understanding 10 = Mind mapping 12 = Summary and reference 13 = Planning 14 = Organising materials 15 = Breaking down tasks 16 = Selection of reading 18 = Printing out paper 19 = Self-condition management 20 = Relating to previous reading materials 21 = Assignment focus 23 = Revert/rehearsal 24 = Discussion with others 27 = Further research and wide reading 30 = Scanning 31 = Starting early 32 = Verbal learning 33 = Spend more time and fully engagement 36 = Imagine the application to real situation 99999 = Missing data
46	The secondary strategy used for effective reading	2nd StraReadi	Same as above
47	The third strategy used for effective reading	3rd StraReadi	Same as above
48	The fourth strategy used for effective reading	4th StraReadi	Same as above
49	Using strategy for effective	UseStrRed	0 = No strategy

	reading		1 = Single strategy 2 = Multi-strategy 99999 = Missing data
50	I was clear about what I was supposed to learn	AwareCon	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
51	It was difficult for me to understand learning content on my own	DiffiUndCot	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
52	I was fully motivated to work on understanding learning content	MotiUndCo	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
53	I made connections to what I already know for better understanding	RefeExiKn	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
54	I related learning content to practical or real life contexts	RefExper	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
55	I understood the learning content which I was supposed to learn after completion of the subject	SelfEvelu	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
56	I still need to know how to understand the learning content more effectively	NeStraUnC	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
57	The first strategy used to understand learning content	1st StraUndCont	0 = No learning strategy 1 = Focusing on the problems 2 = Focusing on the requirement/assessments 3 = Self-condition management

			4 = Brain maps and Imagination 5 = Rehearsal and Memorise – 'writing notes to memorise if going into exams' 6 = Using learning directions provided by university 7 = Wide reading and background study 8 = Making notes and Summarise 10 = Discuss with others/ Discussion with people have relevant experience 11 = Peer collaboration 13 = Application to real life experience and previous working experience 14 = Revert important points 15 = Check if the understanding is right 16 = Using test book 17 = Using provided technologies 18 = Focusing on assignment 19 = Asking help from tutor 20 = Not satisfied with learning content 21 = Using dictionary for dealing with language problems 22 = Giving time for understanding 24 = Skimming the paper and capture whole picture 26 = Verbal learning 27 = Not applicable 28 = Ask family member or friends 29 = Seeking weak areas 30 = No difficulties in learning 31 = Didn't understand the questions 32 = Structuring reading list 33 = Approaching professionals 99999 = Missing data
58	The second strategy which I used to understand learning	2ndtStraUndCont	Same as above

	content		
59	The third strategy which I used to understand learning content	3rdStraUndCont	Same as above
60	The fourth strategy which I used to understand learning content	4thStraUndCont	Same as above
61	Strategies used for understanding learning content	UseStrUnd	0 = No strategy 1 = Single strategy 2 = Multi-strategy 99999 = Missing data
62	I knew what support I could get from the programme	AwarSup	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
63	I got support when I communicated about my learning needs with the relevant staff in the program	GotSup	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
64	I was motivated to communicated with the staff when I needed support	MotiSeSup	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
65	I sought support from other students	SeSupPe	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
66	I sought support from colleagues	SeSupCol	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
67	I sought support from friends and/or family members	SeSupFFam	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
68	I solved problems in learning by seeking support	SeEvaluSup	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data

69	I still need to learn how to seek more support for learning	NeStraSup	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
70	The first strategy used to seek more support for my learning	1st StraSeSup	0 = No strategy 1 = Using provided support system 2 = Learning from tutors 3 = Learning from students 6 = Learning from colleagues other professionals 7 = Learning from family members 8 = Seeking more resource and use of internet 9 = Managing personal condition as a learner 10 = Talking openly 12 = Need support but not using it 13 = Contacting with support team 15 = Useless of the support 16 = Judging by final result 18 = Deep learning 19 = Praying to god 99999 = Missing data
71	The second strategy used to seek more support for my learning	2nd StraSeSup	Same as above
72	The third strategy used to seek more support for my learning	3rd StraSeSup	Same as above
73	The fourth strategy used to seek more support for my learning	4th StraSeSup	Same as above
74	Using learning strategy for seek support	UseStrSesuP	0 = No strategy 1 = Single strategy 2 = Multi-strategy 99999 = Missing data
75	I understood the purpose of use of information technologies in my programme.	AwarTech	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
76	It was difficult for me to use technologies provided by the distance learning programme	DiffiUsTe	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data

77	I was fully motivated to use technologies for better study	MotiUsTech	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
78	I have learned skills in technology for more effective study	LearSkiTe	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
79	I embraced additional technologies in my study (apart from what have been provided in the distance learning system).	EmbAdTech	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
80	The use of technologies was significant for my learning efficiency	SelEvaUsTe	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
81	I still need training sessions to improve my IT skills	NeedImTech	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
82	The first strategy used to improve the use of technology	1st StratgUsTech	0 = No strategy 1 = Extra learning of relevant knowledge and skills 2 = Learning from everyday practice 3 = Using provided support 4 = Using technology for interactive learning 5 = Using technology for reading 6 = Using existing knowledge and experience 7 = Asking for help 8 = Using technologies for further research 9 = Not available 99999 = Missing data
83	The second strategy used to improve the use of technology	2nd StratgUsTech	Same as above
84	The third strategy used to improve the use of technology	3rd StratgUsTech	Same as above
85	The fourth strategy used to	4th StratgUsTech	Same as above

	improve the use of technology		
86	Using strategies for use of technology	UseStrImTe	0 = No strategy 1 = Single strategy 2 = Multi-strategy 99999 = Missing data
87	I rely on tutors' comments to evaluate and improve my learning	RelTuCom	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
88	I normally got feedback on time	GotFeOnT	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
89	The feedback I obtained was what I expected.	SatiFedb	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
90	I could maintain motivation even if I did not get feedback comments	MaiMotFebk	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
91	First answer of what feedback and tutor's comments mean to you	1stMeanFebk	0 = No feedback provided in the system 1 = Connection of students and tutors and Isolation 2 = Evaluation 3 = Keeping the study on right direction 4 = Guidance in improvement of learning skills and understanding of knowledge 5 = Focus of the important areas 6 = Motivation 7 = Correct mistakes and problem solving 8 = Constructive critic 9 = Positive attitude to feedback 10 = Instil confidence 11 = Knowing self-capability 12 = Feedback is useless 13 = Supporting and guidance of assessment 14 = Finding weak areas to

			focus on 15 = Need more feedback 16 = Not applicable 17 = Supporting group decisions 18 = Encouragement 19 = Not sure 99999 = Missing data
92	Second answer of what feedback and tutor's comments mean to you	2nd MeanFebk	Same as above
93	Third answer of what feedback and tutor's comments mean to you	3rd MeanFebk	Same as above
94	Fourth answer of what feedback and tutor's comments mean to you	4th MeanFebk	Same as above
95	I developed my own strategies for learning effectively when I could not obtain feedback and/or could not get it in time	StratgDev	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
96	The first strategy used for effective learning when I could not obtain feedback	1st StratDeFebk	0 = No strategy 1 = Using documentation support provided by university 2 = Seeking human (peer, seniors) support/interaction with others 3 = Evaluating self-achievement based on marks /self-evaluation/ Self-judgement 4 = Determination in everyday work / Focus on future 5 = Seeking answer by reading and studying / Learn from past feedback 6 = Self-interest 7 = Not applicable 8 = Self diagnose 9 = Don't need to use strategy 10 = Review previous feedback 11 = Using existing knowledge of learning strategy 12 = Interacting with the feedback 13 = Personal timetable 14 = Interacting by using provided IT system

			15 = Feedback should not be expected in distance learning 16 = Seeking support from the content 99999 = Missing data
97	The second strategy used for effective learning when I could not obtain feedback	2nd StratDeFebk	Same as above
98	The third strategy used for effective learning when I could not obtain feedback	3rd StratDeFebk	Same as above
99	The fourth strategy used for effective learning when I could not obtain feedback	4th StratDeFebk	Same as above
100	Using strategies to deal with the problems of feedback	UseStrFed	0 = No strategy 1 = Single strategy 2 = Multi-strategy 99999 = Missing data
101	I understood the assessment/assignment questions	AwarAss	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
102	In general, I find the assessments/assignments difficult	DiffiAss	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
103	I was fully motivated to work for the assessment/ assignment	MotiAss	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
104	I developed a plan for working on assessment/assignment	PlanStraAss	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
105	I started to prepare assessment/assignment early rather than leave it until the last minute	EarStaAss	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data
106	I was satisfied with my marks	SatiMark	1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree 99999 = Missing data

107	The first strategy used for preparing assessments	1st StratPreAss	0 = No strategy 1 = Wider reading and deep learning 2 = Using provided support 3 = Time management 4 = Planning and stepping in planning/scheduling 6 = Seeking support /proof reading 8 = Writing and developing draft 9 = Single question focus 10 = Assignment focus 11 = Focusing on the questions 1and structure answers 12 = Learning from previews exams 13 = Breaking down the tasks 14 = Making notes and ideas 16 = Controlling panic as a motivation tool 17 = Brain mapping 18 = Related to real life 19 = Asking further explanation for dealing with language problems 20 = Starting early 21 = Finishing early 22 = Checking and proof reading 23 = Not applicable 24 = Gathering all the information before start writing 25 = Carefully understand the questions 26 = Perseverance 27 = Maintaining motivation and reduce distraction 28 = Managing psychological dynamics 29 = Environment management 99999 = Missing data
108	The second strategy used for preparing assessments	2nd StratPreAss	Same as above
109	The third strategy used for preparing assessments	3rd StratPreAss	Same as above
110	The fourth strategy used for preparing assessments	4th StratPreAss	Same as above
111	Using strategies for preparing assessments	UseStrPreAss	0 = No strategy 1 = Single strategy

			2 = Multi-strategy 99999 = Missing data
112	Total value of level of awareness on DE	AwerSum	Calculated value
113	Total value of the level of students ability in dealing with difficulties	AbiSum	Calculated value
114	Total value of level of motivation in six groups of leaning activities	MotiSum	Calculated value
115	Total value of self-report on the effectiveness of using strategies	EvaluSum	Calculated value
116	Total value of metacognitive capability in reading	TotalCapred	Calculated value
117	Total value of metacognitive capability in understanding learning content	TotalCapUn	Calculated value
118	Total value of metacognitive capability in seeking support	TotalCapSeSu	Calculated value
119	Total value of metacognitive capability in using technology	TotalCapUsTe	Calculated value
120	Total value of metacognitive capability in dealing with feedback problems	TotalCaFed	Calculated value
121	Total value of metacognitive capability in preparing for evaluation	TotalCapAss	Calculated value
122	Capital value of students learning capability in six groups of leaning activities and five learning components	CapiTotal	Calculated value

Appendix 12. Modified distance learning experience questionnaire

Distance Learning Experience Questionnaire (Modified)

Welcome

This questionnaire is designed for a PhD research project which aims to contribute to an effective distance learning experience for students from a range of different backgrounds. This questionnaire has been designed to allow you to describe, in a systematic way, your distance learning experience (feelings, use of strategies and motivations). This will help to improve distance education delivery based on students' learning experience. It is important that you respond truthfully so that your answers will describe your actual ways of studying. It will take approximately 10-15 minutes to complete.
All data provided will be strictly confidential and your participation will be much appreciated.
You have the right to participate, to refuse, or to withdraw at any time.
Please read the statement below and confirm your willingness to participate if you are interested. If you have any questions, you are welcome to contact the researcher at the email address provided.
Thanks for your collaboration!

Shuting Guo
The School of Built and Natural Environment
Northumbria University
Email: shuting.guo@nortumbira.ac.uk

Please confirm your agreement of participation

I understand the purpose of this research and agree to participate. I also agree the data collected from me, may be held securely and confidentially and will be used for the purposes of research only.

Please select 'Next' to continue the survey; or select 'Back' if you are not interested (this is for online system).

Part one: Background information

1) Within which subject area are you studying?

( ) Built Environment ( ) Business ( ) Law ( ) Computing ( ) Art and Social Science

( ) Design ( ) Health and Education ( ) Other

2) What level is the programme you are studying?

( ) Foundation level ( ) Undergraduate level ( ) Postgraduate level

3) Does the programme you are studying provide credits for any professional qualification?

( ) Yes ( ) No ( ) Unsure

4) Are you interested in applying for professional qualifications using the credits obtained from this course?

( ) Yes ( ) No ( ) Unsure ( ) Not applicable

5) The reason for you studying by distance learning is:

_____

6) How long have you been involved in the distance learning programme on which you enrolled?

( ) 6 months or less ( ) 6-12 months ( ) 13-18 months ( ) 19-24 months ( ) longer

7) How long have you been involved in distance learning (including your previous experience if you have any)?

( ) 6 months or less ( ) 6-12 months ( ) 13-18 months ( ) 19-24 months ( ) Longer

8) The minimum hours that you spent on distance learning per week: _____

9) The average mark that you typically attained is:

( ) Under 40 ( ) 40-49 ( ) 50-59 ( ) 60-69 ( ) 70-79 ( ) 80 and above

10) How well do you think you're doing on your distance learning programme, based on your satisfaction with the knowledge you obtained and your learning experience (NOT your marks)?

( ) Very well ( ) Well ( ) So-so ( ) Not well ( ) Not very well

11) What is your gender? ( ) Male ( ) Female

12) Please select a relevant category for your age:

( ) Under25 ( ) 25-34 ( ) 35-44 ( ) 45-54 ( ) 55andover

13) Is English your first language? ( ) Yes ( ) No

14) Do you have domestic responsibility, for example, looking after children, elders?

( ) Yes ( ) No

Part two: learning experience

Overview of distance learning experience

15) I felt isolated whilst learning at a distance.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

16) When learning, I was easily distracted.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

17) I sought an appropriate environment for effective learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

18) I organised my study time carefully to make the best use of it.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

19) I set clear goals in distance learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

20) I checked my progress in achieving learning goals.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

21) I believe that success in learning mainly depends on my own effort.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

22) I like the flexibility of distance learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

About reading learning materials

23) I knew what I was supposed to read.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

24) It was difficult for me to finish the amount of reading required.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

25) I was fully motivated to do the reading.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

26) I completed what I was supposed to read.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

27) I still need to learn how to read faster and more effectively.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

28) The strategies which I used for effective reading also include (please write in):

_____

About understanding the content of learning materials

29) I was clear about what I was supposed to learn.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

30) It was difficult for me to understand learning content on my own.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

31) I was fully motivated to work on understanding learning content.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

32) I understood the learning content which I was supposed to learn after completion of the subject.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

33) I still need to know how to understand the learning content more effectively.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

34) The strategies which I used to understand learning content also include (please write in):

_____

About seeking learning support

35) I knew what support I could get from the programme.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

36) I got support when I communicated my learning needs to the relevant staff in the program.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

37) I was motivated to communicate with the staff when I needed support.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

38) I solved problems in learning by seeking support.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

39) I still need to learn how to seek more support for learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

40) The strategies which I used to seek more support for my learning also include (please write in):

_____

About use of information technology (IT)

41) I understood the purpose of using information technologies in my programme.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

42) It was difficult for me to use technologies provided by the distance learning programme.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

43) I was fully motivated to use technologies for better study.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

44) The use of technologies was significant for my learning efficiency.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

45) I still need training sessions to improve my IT skills.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

46) The strategies which I used to improve the use of technology also include (Please write in):

_____

About influence of tutors' comments and feedback

47) I rely on tutors' comments to evaluate and improve my learning.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

48) I normally got feedback on time.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

49) The feedback I obtained was what I expected.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

50) I could maintain motivation even if I did not get feedback and comments.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

51) I developed my own strategies for learning effectively when I could not obtain feedback and/or could not get it in time.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

52) The strategies which I used for effective learning when I could not obtain feedback were (Please write in):

_____

About assessment/assignment

53) I understood the assessment/assignment questions.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

54) In general, I found the assessments/assignments difficult.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

55) I was fully motivated to work for the assessments/assignments.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

56) I was satisfied with my marks.

( ) Strongly disagree ( ) Disagree ( ) Neutral ( ) Agree ( ) Strongly agree

57) The strategies which I used for preparing assessments also include (please write in):

_____

Part three: Open comments

58) The last question gives you the opportunity to highlight any specific distance learning strategies which have not been included in the previous questions. And please state how effective they are in supporting your learning.

Thank you very much for your time in completing this questionnaire. It is very much appreciated.

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